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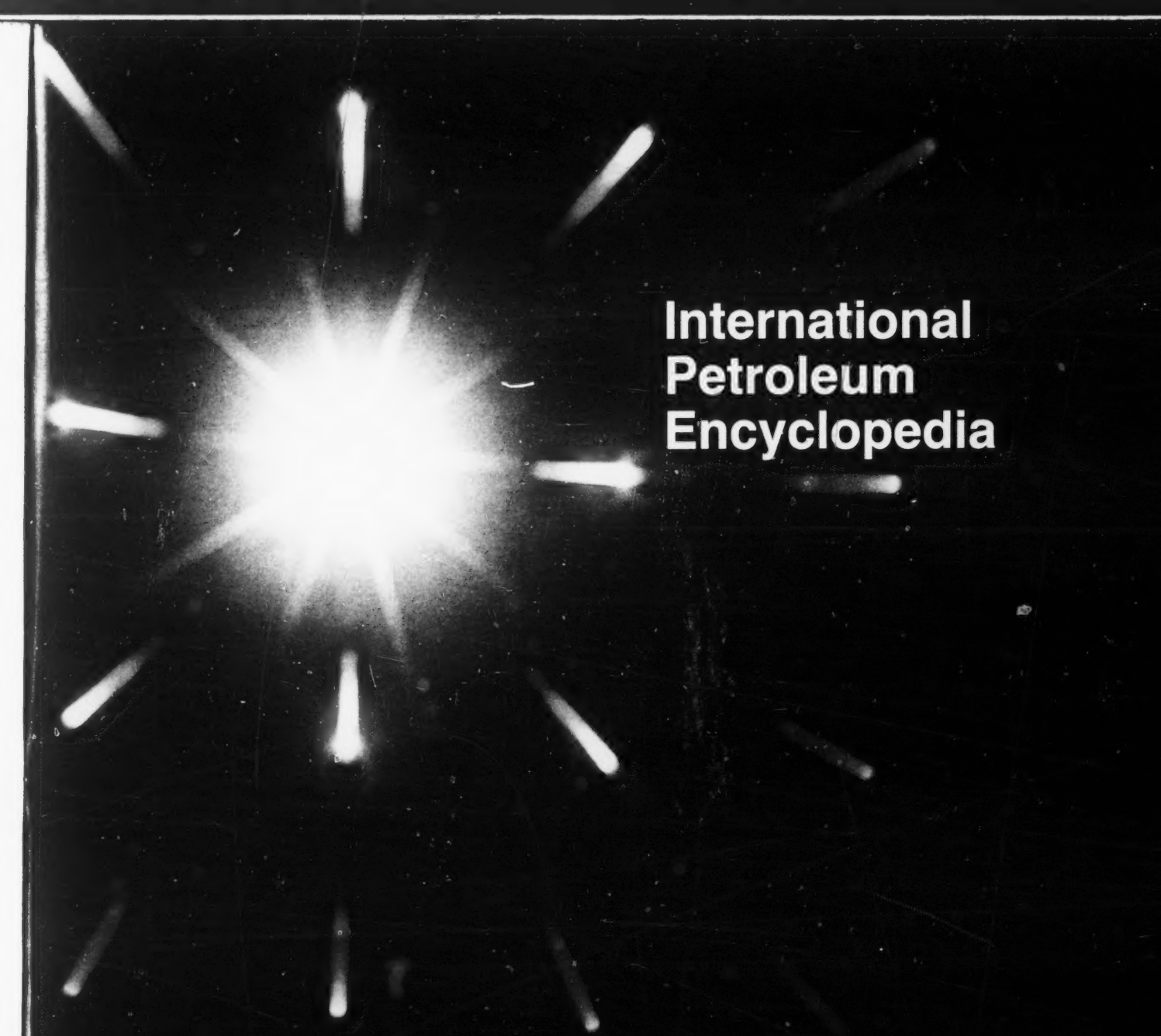

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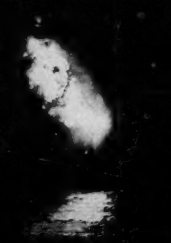

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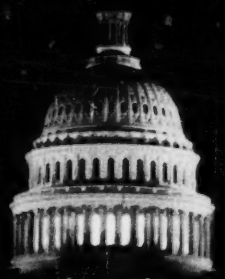

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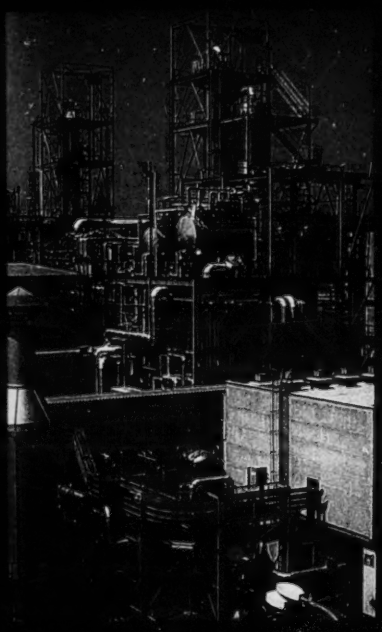

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Table 1

Results of activity on area-wide lease sale tracts

— Sale — Number	Region*	Date	Blocks Offered	Leased	Drilled	Percentage drilled	Producing	Wells drilled Platforms	Exploratory	Development	Number of blocks	Percentage with discoveries	Discoveries Oil or oil and gas	Gas	New fields
72	C	05/25/83	7,050	623	191	31	8	14	258	14	59	9	15	24	39
74	W	08/24/83	5,848	436	111	25	0	2	137	6	33	8	2	20	22
79	E	01/05/84	8,868	156	1	1	0	0	1	0	0	0	0	0	0
81	C	04/24/84	6,502	529	22	4	0	1	29	0	6	1	0	1	1
84	W	07/18/84	5,441	361	4	1	0	0	4	0	0	0	0	0	0
98	C	05/22/85	4,567	409	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	**38,276**	**2,514**	**329**	**12.4**	**8**	**17**	**429**	**20**	**98**	**3.6**	**17**	**45**	**62**

*C = central, E = eastern, W = western.
Source: Minerals Management Service

of Mexico," said John H. Lollar, president of Transco Exploration Co.

"All we needed was something like the open lease sales to attack it properly."

Results of operations

Results tallied from Sale 72 and five more area-wide gulf sales showed that 329 blocks had been drilled out of 2,514 leased, 62 fields had been discovered, and 17 platforms had been installed as of Apr. 1, 1985 (Table 1).

MMS conducted a seventh area-wide sale, 102, off Texas the following August.

As year-end 1985 approached, industry had spent almost $8.8 billion to lease nearly 2,600 tracts in the gulf since area-wide leasing went into effect. That compared with 3,559 tracts leased for $32 billion in all previous gulf sales.

Industry's response to a vastly expanded inventory of exploration acreage caused a rebound in the gulf count of active rigs, which on average had slipped to less than 150/month after building almost steadily to a record of more than 250/month in 1981 (Fig. 2).

The rebound fizzled in 1984, the victim of declining oil and gas prices as a result of surpluses.

Exxon Corp. Pres. L.G. Rawl said the 1,185 area-wide tracts leased in 1983 alone resulted in the drilling of 240 exploratory wells with at least 68 field discoveries or extensions. In addition, production platform installations in the gulf were up about 40% in 1984 compared with the year before.

The increase in exploration/development also spawned a turnaround in gulf reserves additions (Fig. 3).

Industry booked almost 1.1 billion bbl of oil equivalent reserves additions in the gulf in 1984.

That returned the gulf to its performance level of the late 1970s. Gulf reserves additions sank to 699.3 million bbl in 1980, then began to rise.

And reserves additions in the gulf returned to their late 1970s level of about 30% of the U.S. total after sliding to 17% in 1981.

Adequate drilling

The present level of drilling activity in the Gulf of Mexico will thoroughly explore the large acreage inventory industry acquired through area-wide leasing, L. Paul Teague, Texaco U.S.A. vice-president of production told a Wood, Mackenzie & Co. Inc. seminar in New Orleans late in 1985.

However, there could be a sharp increase in gulf drilling in 1987-89 when leases begin expiring if, for example, U.S. natural gas markets are strong enough to warrant gas development drilling.

The gas deliverability surplus drastically reduced development drilling in the gulf, Teague said, because more than 70% of gulf hydrocarbons production is gas.

Teague said his belief that drilling activity is sufficient to explore the current lease inventory assumes:

- Evaluation will require 1.65 wells/lease.
- At least 80% of the leases will be evaluated by drilling. The remaining 20% will be dropped undrilled because, among other things, drilling on nearby prospects was unsuccessful.
- The July 1985 mobile rig activity level will be maintained. Hughes Tool Co.'s weekly count showed an average of 179 mobile rigs at work in the gulf that month.
- At least 80% of the mobile rigs will drill exploratory wells.
- Four wells will be drilled per rig-year.

Those assumptions did not take into account water depth capability of rigs. Because so many deepwater tracts had been leased in recent years, there eventually may be a shortage of rigs capable of drilling in water deeper than 600 ft.

There were 700 undrilled leases due to expire in 1988 and 876 due to expire in 1989, the peak year (Fig. 4).

Nevertheless, "Even into 1990, the number of wells that can be drilled based on these assumptions will evaluate the leases," Teague said (Fig. 5).

"But I am not saying that this will come about."

For one thing, the analysis did not take into account immediate drilling on leases that will be acquired in coming years.

Teague said lessees will more than likely begin pushing farmouts in earnest in 1987.

Texaco, with 249 undrilled tracts, had one of the largest leaseholds in the Gulf of Mexico. It was running 12 rigs.

"I expect Texaco's activity in 1986 to be about the same level, which means we can evaluate our leases with that level of activity only if we are involved in farmouts," Teague said.

He said he believes other lessees will not let any tract go undrilled that should be drilled, either directly or by farmout.

"What you may see, however, is a delay in exploitation of leases after discovery because of current gas markets."

Texaco was producing only two thirds of its gas productive capacity in the Gulf of Mexico. Although reduced gas takes were a concern, of bigger concern was the sharp fall in gas prices.

"The price of gas has gone from $4.01/MMBTU in 1982 to an average, thus far in 1985, of about $2.57/MMBTU," Teague said.

"Currently, the price is only about $2.15/MMBTU.

Ewing Bank areas. A 24 slot drilling template was to be set in about 1,600 ft of water in the north central part of Block 29. The template will be designed to receive flow lines from remotely drilled satellite wells. Placid planned to convert Penrod Drilling Co.'s Penrod 72 semisubmersible into a combination drilling/production vessel. Liquid and gas lines will be laid from the floater to a production platform to be installed in shallower water.

• Exxon Co. U.S.A.'s Mississippi Canyon Block 397 discovery. Exxon in 1984 found a reservoir that holds more than 100 million bbl of oil equivalent on the block. Its discovery well cut about 350 ft of net pay.

• Exxon's Mississippi Canyon Blocks 354, 355, 398, 399 discoveries. The company planned a 2 year subsea production test of four wells it drilled on a structure underlying the tracts. Exxon planned to install a five slot subsea template and lay a 7½ mile gas pipeline to an existing platform in shallower water.

• Exxon's Platform Lena. An Exxon group installed Platform Lena, the world's first commercial guyed drilling/production tower, in 1,001 ft of water in 1983 on Mississippi Canyon Block 280 to develop Blocks 280 and 281. The platform can produce 25,000 b/d of oil, 50 MMcfd of gas, and 5,000 b/d of condensate.

• ARCO Oil & Gas Co.'s Mississippi Canyon Block 148 platform. An ARCO group installed the 28 slot platform in 650 ft of water in 1980. Production, which had been as much as 125 MMcfd of gas, slumped due to poor gas markets. ARCO can drill additional wells to boost productive capacity when markets improve.

• Shell's Platform Cognac. Installed by a Shell group in a record 1,025 ft of water in 1978 on Mississippi Canyon Block 194, Cognac produces from Blocks 194, 195, 150, and 151. Sixty-one wells are on production.

• Sohio's Mississippi Canyon Block 20 platform. Sohio began production late in 1984 from this 28 slot platform. Production was expected to be about 7,000 b/d of oil and 25 MMcfd of gas from proven reservoirs. Drilling of unproven fault segments was expected to significantly increase production.

• Sohio's Mississippi Canyon Blocks 109 and 110 discoveries. A Sohio group was evaluating a 3D seismic survey of the area. The Block 110 discovery, in 1,456 ft of water, flowed 322 b/d of oil and 1.35 MMcfd of gas on drillstem tests. The Block 109 discovery, in 1,086 ft of water, flowed 1,471 b/d of oil and 662 Mcfd of gas from zones encountered in the Block 110 test.

• Getty's record water depth well. A Getty group drilled the Gulf of Mexico record water depth test, a dry hole, in 1983 on Mississippi Canyon Block 852 in 3,450 ft of water.

• Sohio's Viosca Knoll Blocks 816 and 817 discoveries. A Sohio group was evaluating the discoveries. The Block 817 strike flowed 5.16 MMcfd of gas. The Block 816 discovery wasn't flow tested.

Other deepwater discoveries had not been disclosed by operators. Under federal rules lessees have 2½ years after completing a well before public disclosure of data is required.

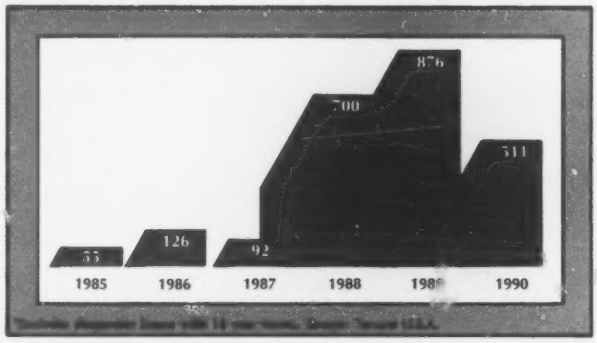
Favorable geology

An MMS report showed that deepwater areas of the northern gulf—the Continental Slope and the outer reaches of the Continental Shelf—possess the three ingredients required for formation and accumulation of oil and gas because:

• Porous sands, which serve as a reservoir for migrating hydrocarbons, interfinger with impermeable shale, a source rock.

• Organic material deposited with fine grained clays and muds was preserved instead of oxidized, which is the tendency in shallower, more turbulent water, and was subjected to a favorable thermal regime for generation of oil and gas in the sediments.

When undrilled gulf leases expire* 4



• Increased overburden of the seaward advancing shallow marine deposits over moldable salt and marine shales tended to start the salt flow that triggered growth of salt domes and regional expansion faults, which in turn provided traps for hydrocarbons.

Miocene deposits, well stratified throughout the deep basin, are presumed to consist of alternating layers of sandstone and shale that could act as reservoir rocks and reservoir seals.

Analyses of samples from Deep Sea Drilling Project holes and seismic data indicate that, for at least the western part of the deep gulf, the Rio Grande River provided sediments from middle Miocene to Pleistocene time.

Pliocene and Pleistocene strata that make up the upper sequence of the deep gulf basin reflect a substantial change in the general depositional pattern of Miocene sediments. This change, MMS said, can be attributed to huge volumes of sediments delivered to the east and central gulf from northern glaciated regions in the continental interior.

Overall, the sequence of Pleistocene sediments in the gulf was deposited during a regression stage, when shallow gulf waters contracted and land emerged, occasionally interrupted by short periods of transgression when the opposite occurred.

New installations for deep water

Three prime examples of deepwater production technology were advancing at year-end 1985.

Conoco's concept of a TLWP (Fig. 8) was a modified version of the tension leg platform the company installed in 1984 in Hutton field of the U.K. North Sea.

The Hutton TLP contains all production and drilling equipment. But the Green Canyon TLWP, if Conoco and partners decided to proceed with the project, would hold only wellheads, a well test system, a workover rig, and possibly a gas compression system.

Shell in June 1985 disclosed its decision to push conventional steel jacket platform technology to world record water depths for a second time in the Gulf of Mexico.

The company let contract for a 1,365 ft tall steel jacket for Platform Bullwinkle as part of its development project for Green Canyon Blocks 64, 65, and 109. The jacket will be the world's tallest single piece platform jacket (Fig. 9).

Placid expected to start production from a floating system in its part of the Green Canyon-Ewing Bank play in mid-1987.

Placid's partners in the deepwater effort were Enserch Exploration Partners Ltd., Louisiana-Hunt Petroleum Corp., Opubco Resources Inc., HI Production Co., Penrod Energy Co., Petro Hunt Corp., and Prosper Energy Corp.

All were Hunt/Placid affiliates except Enserch and Opubco.

Table 2

Breakout of gulf sale tracts by water depth

Sale			— Number (%) of blocks leased by water depth —			
Number	Location*	Date	Total	Less than 200 m	200-400 m	Greater than 400 m
A62	G	09/30/80	116	106 (91)	4 (4)	6 (5)
62	G	11/28/80	67	64 (96)	0 (0)	3 (4)
A66	G	07/21/81	156	147 (94)	4 (3)	5 (3)
66	G	10/20/81	102	91 (89)	9 (9)	2 (2)
67	G	02/09/82	115	97 (84)	10 (9)	8 (7)
691	G	11/17/82	56	50 (89)	4 (7)	2 (4)
6911	G	03/08/83	11	11 (100)	0 (0)	0 (0)
72	C	05/25/83	623	490 (79)	72 (11)	61 (10)
74	W	08/24/83	406	309 (76)	55 (14)	42 (10)
79	E	01/05/84	156	109 (70)	24 (15)	23 (15)
81	C	04/24/84	453	258 (57)	30 (7)	165 (36)
84	W	07/18/84	361	221 (61)	61 (17)	79 (22)
98	C	05/22/85	409	284 (69)	12 (3)	113 (28)

*C = central, E = eastern, W = western, G = prearea-wide lease sale.
Source: Minerals Management Service

Conoco's TLWP

All development wells would be drilled prior to installation of Conoco's TLWP. Other production equipment and personnel accommodations would be on a permanently moored tanker in shallower water in the northwest quarter of Green Canyon Block 184, about 2 miles from the TLWP.

Total cost of the project was thought to be $500 million.

Conoco and partners Texaco Producing Inc. and Cities Service Oil & Gas Corp. had not disclosed a final decision on development of the block at year-end.

E. J. Grivetti, Conoco executive vice-president of North American exploration/production, said the TLWP concept was being considered because costs in deep water rise rapidly in relation to platform weight.

The Green Canyon TLWP would be about one-third the size of the Hutton TLP.

"Compared with a conventional steel platform," Grivetti said, "the TLWP is more economical because it requires only 5,000 tons of steel vs. 50,000 tons or more for a rigid platform designed for this water depth."

The TLWP would be connected to the seabed by vertical tubular steel mooring lines. Buoyancy of the platform would keep the legs under tension and the platform in place.

As many as 24 development wells would be drilled through a template on the seabed while the TLWP was being built. Production would begin shortly after installation of the TLWP.

The subsea pipeline system being considered would involve transportation of oil production from the template to the tanker and water from the tanker to injection wells.

Andrew Hunter, Conoco's supervisor of special marine projects, said, "There is a strong possibility we may need a water injection system for pressure maintenance."

He said options being considered for the oil/water pipeline system were two 10 in. lines or a single 18 in. line. If delineation determines the water injection system is not needed, it will not be incorporated into the final development plan.

In addition, a natural gas sales line laid to existing lines in shallower waters was being considered.

Brown & Root Inc., Houston, received contracts for preliminary design and engineering of the drilling and foundation templates and subsea pipelines. Fluor Engineers Inc., Irvine, Calif., received a contract for preliminary design and engineering of the mooring system.

Oil would be transported via subsea pipeline to the tanker, which would store the crude until it could be carried ashore. Design for flow lines between subsea water injection wells and the tanker is included in the pipeline contract.

Conoco's discovery on Green Canyon Block 184 was drilled in 1981 on a tract leased for $7.8 million in OCS Sale A62 in 1980.

The discovery well, drilled in 1,530 ft of water, flowed 2,765 b/d of 35.5-44.3° gravity oil and 3.4 MMcfd of gas from three Pleistocene sands below 7,000 ft. The best flow was 1,346 b/d of 44.3° gravity oil and 1.7 MMcfd of gas through an $^{18}/_{64}$ in. choke with 2,375 psi flowing tubing pressure from perforations at 7,997-8,016 ft.

Conoco later drilled five other wells. One well tested a structure in the block's northwest quarter. The remaining four wells were in the block's southeast quarter.

In addition to the high cost of deepwater development, Conoco had taken 4 years to determine a development plan because of risky, broken geology in the Green Canyon area.

Blocks in the Green Canyon area cover a large, linear, salt massif with a number of shallow, very young, probably still structurally active piercement domes. Conoco's evaluation of Block 184 geology changed as new data become available.

Platform Bullwinkle

A conventional steel platform will be more cost effective than compliant structures that were considered for the Bullwinkle project, Shell said.

Platform Bullwinkle's jacket section will weigh about 50,000 tons. The entire platform will weigh a record 78,000 tons.

Shell let contract to Bullwinkle Constructors, a joint venture of Gulf Marine Fabricators and Kaiser Steel Corp., for fabrication, transportation, and installation of Bullwinkle's jacket.

Fabrication was scheduled at Ingleside Point near Corpus Christi, Tex.

About 50% of the $500 million development cost, excluding lease bonus, will be spent to install and equip the platform in preparation for drilling. The remaining 50% will be spent for development drilling, permanent production facilities, and a pipeline system.

With two drilling rigs in place, the entire structure will stand about 1,615 ft tall, 161 ft taller than the world's tallest building, Sears Tower in Chicago.

The jacket will be transported to the field and launched from a specially built, world record size barge to be provided by the contractor.

Shell said it believes installation of the platform will be finished in September 1988, and development drilling will be finished during third quarter 1990.

Shell expected to begin production from Bullwinkle while drilling continues in first quarter 1989. Production through permanent facilities will occur in 1991. Oil production was expected to peak at 50,000 b/d in 1991, gas production at 90 MMcfd 1 year later.

Shell discovered the Green Canyon field in 1983 with a wildcat in Block 65. By mid-1985, four wells and four sidetrack holes had been drilled in the three blocks that encompass the field.

Shell acquired Block 65 for $20.7 million and Block 109 for $9.4 million in the gulf's first area-wide lease sale. Block 64 garnered a $4.4 million bonus 1 year later. All three blocks are 100% owned by Shell.

Placid's project

Penrod 72 will be outfitted with a new, highly sophisticated mooring system and a production system needed for first-cut processing.

After template drilling has been completed, the rig function will be limited to production and well workover operations. The complement of processing equipment on Penrod 72 will be expanded after drilling operations cease to handle gas lift or other needs.

The key component in the Placid group's production system is a free standing production riser that will allow full well stream flow from the subsea, wet, electrohydraulically controlled trees—as many as 24—to surface chokes on Penrod 72.

In addition to the 24 flow lines, the riser will contain an annulus line for each well for individual gas lift or casing annulus monitoring.

Separate oil and gas transport lines also will be housed in the riser.

The riser design will incorporate a top disconnect feature to allow Penrod 72 to disengage for maintenance or emergency purposes.

The Placid group planned to lay a 14 in. crude oil/condensate pipeline and a 16 in. gas pipeline from the Green Canyon Block 29 template to Ship Shoal Block 207, a shallow water complex operated by Placid. A production platform will be installed at that location for final cut processing of the deepwater oil and gas production.

The group planned to lay the 52 mile pipeline during the 1986 summer construction period. Conventional pipelaying techniques will be employed over the portion of the route having water depths of 500 ft or less. The bottom tow method will be employed for the segment in deeper water.

The Placid group was designing its pipeline system for expandability. It planned to develop and tie in other Flexure trend discoveries as they occur.

Robert G. Fowler, president of Enserch Exploration Inc., said the group chose a subsea template/floater production system to develop the area because of costs. The cost of the system, excluding well costs, will be about $100 million.

Fixed and compliant production systems in similar water depths elsewhere in the gulf were expected to cost $500 million.

The group's most recent discovery was on Green Canyon Block 31.

The discovery well flowed 3,014 b/d of 49.6° gravity oil and 16.25 MMcfd of gas through a $^{42}/_{64}$ in. choke with 4,145 psi flowing tubing pressure from Pleistocene perforations at 10,290-356 ft. Tubing diameter limited the flow rate.

The Block 31 well was 7½ miles southeast of Placid's discovery on Ewing Bank Block 999 in 1,600 ft of water.

The Block 999 well flowed 2,692 b/d of oil and 11.3 MMcfd of gas with a flowing tubing pressure of 2,803 psi from one zone and 644 b/d of oil and 9.5 MMcfd of gas from a higher Pleistocene interval.

It confirmed Placid's 1984 discovery on Green Canyon Block 29, which cut 125 ft of net pay based on log and core analyses.

Timing, costs.

Those and other projects illustrated the lead times and costs of operations in deep water.

A profile of a deepwater exploration/development program drawn up by Sohio showed that it can be as long as 8 years from the time a prospect is identified until production and income begin (Fig. 10).

A 100 million bbl discovery is required in 1,200 ft of water to allow the same $4.50/bbl development cost of a 20 million bbl discovery in only 300 ft of water.

Sohio's figures covered an operation limited to one tract with no dry holes and without consideration of exploration costs elsewhere.

Deepwater pipelines.

Near year-end 1985 Shell Development Co. asked industry support for a program to technically evaluate pipeline, flow line, and riser installations in 1,000-3,000 ft of water.

The 15 month program, scheduled to get under way early in 1986, was to consist of physical model simulations augmented by numerical analysis at a cost of $600,000. Shell's wave tank at its Westhollow research facility in Houston was to be used for model simulations.

Model scales were to vary from 1:200 to 1:10, depending on the type of test.

Shell said development of more than a dozen leases in waters 1,000 ft deep or deeper is planned in the Gulf of Mexico alone. And similar projects are planned worldwide.

The need for diverless installation will increase the cost of deepwater pipelines, flow lines, and risers, the company said. And operators face potentially large costs if contractors on day rates run into difficulties in installation operations.

So Shell sought an evaluation to mark potential problems with a given installation method, compare its risks with alternative methods, and recommend improvements in methods and equipment.

The company planned to evaluate first end and second end tie-in methods to connect deepwater pipelines and flow lines to subsea structures and catenary risers to floating production systems.

Corsair trend

Not all of the gulf's challenging operations take place in deep water. Projects in shallower water can pose challenges, too.

An example is Shell operations in an area off Texas it designated the Corsair trend (Fig. 11).

Seismic surveys and drilling helped the company unravel complex geology in the deep, geopressured gas trend.

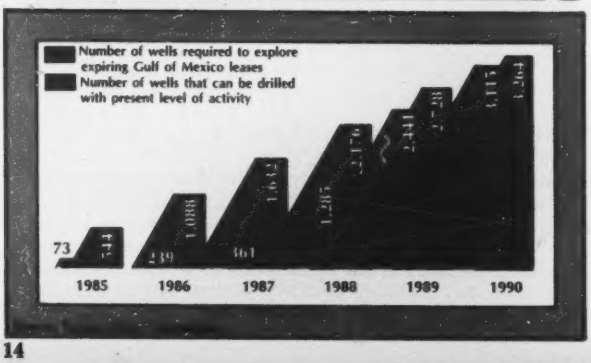
The company drilled a gas discovery on its Picaroon prospect in 1977. And it ran a 3D seismic survey after drilling seven wells—six gas wells and one dry hole—on the prospect in Brazos Blocks A-19 and A-20.

The 3D survey helped pin down geology of the Middle Miocene structure at a cost of $1.5 million—much cheaper than another dry hole.

Shell acquired a 100% interest in Brazos Blocks A-19 and A-20 for $71.3 million and $22.3 million in federal leases in 1978 and 1977.

Shell also established production on its Dubloon prospect, 7 miles southwest of Picaroon. In addition, it set a platform after drilling an apparent discovery on its Plank prospect, 35 miles farther down the trend, but decided not to start production because the pay was too poor.

What's required to explore leases



sands to impermeable shales updip, and at angular unconformities.

East of the delta, prospective Jurassic and Cretaceous traps include updip sections in which sands or porous carbonates pinch out or truncate updip and anticlines developed on the down thrown sides of growth faults, over deep seated salt domes and pillows and very subtle fault closures.

Table 4

Where U.S. oil and gas resources are*

Area	Acreage (Million)	Oil equivalent (Billion bbl)	Oil (Billion bbl)	Gas (tcf)	Probability†
Central Gulf of Mexico	46	10.8	3.7	40.0	1.00
Western Gulf of Mexico	35	6.5	1.5	28.0	1.00
Mid-Atlantic	82	5.5	3.0	14.2	1.00
Diapir Field, Alaska§	49	3.9	3.9	19.7	1.00
North Atlantic	57	2.6	1.5	6.1	0.93
Southern California	22	2.5	1.9	3.4	1.00
Navarin basin, Alaska	37	2.4	1.1	7.3	0.76
Barrow arch, Alaska§	30	2.1	2.1	8.0	0.62
South Atlantic	99	2.0	1.2	4.4	0.84
Cent. and N. Calif.	37	2.0	1.6	2.0	1.00
Eastern Gulf of Mexico	58	1.5	1.2	1.6	0.87
St. George basin, Alaska	70	1.4	0.7	3.9	0.64
Kodiak, Alaska	89	1.2	0.6	3.2	0.61
Gulf of Alaska	133	1.2	0.6	3.1	0.66
N. Aleutian basin, Alaska	32	0.9	0.5	2.2	0.42
Norton basin, Alaska	25	0.7	0.3	2.2	0.57
Shumagin, Alaska	84	0.4	0.2	1.4	0.43
Cook Inlet, Alaska	8	0.2	0.1	0.7	1.00

*Conditional mean estimates. †Marginal probability of commercial hydrocarbons existing in the area. §To 200 ft water depth, considered the limit of current technology.

Source: Minerals Management Service

Western gulf

Petroleum development in the western Gulf of Mexico progressed parallel with the central gulf, although not as rapidly.

The western gulf OCS holds more than 140 producing fields, 84 of them in the Galveston and High Island areas on the north end of the region. Production extends as far south as North Padre Island, where five fields have been discovered.

Miocene reservoirs extend the length of the area in a narrow inshore band that widens to the northeast. Pleistocene reservoirs are found in the northern part of the area. Studies show the possibility of Oligocene reservoir rocks in deeper water. Source rocks consist mainly of organic rich Cenozoic shales.

Trapping mechanisms are the same as those in the central gulf, except that traps associated with rollover into growth faults are more prevalent and salt diapirism is less common. Many anticlinal shale ridges also provide structures for traps.

Eastern gulf

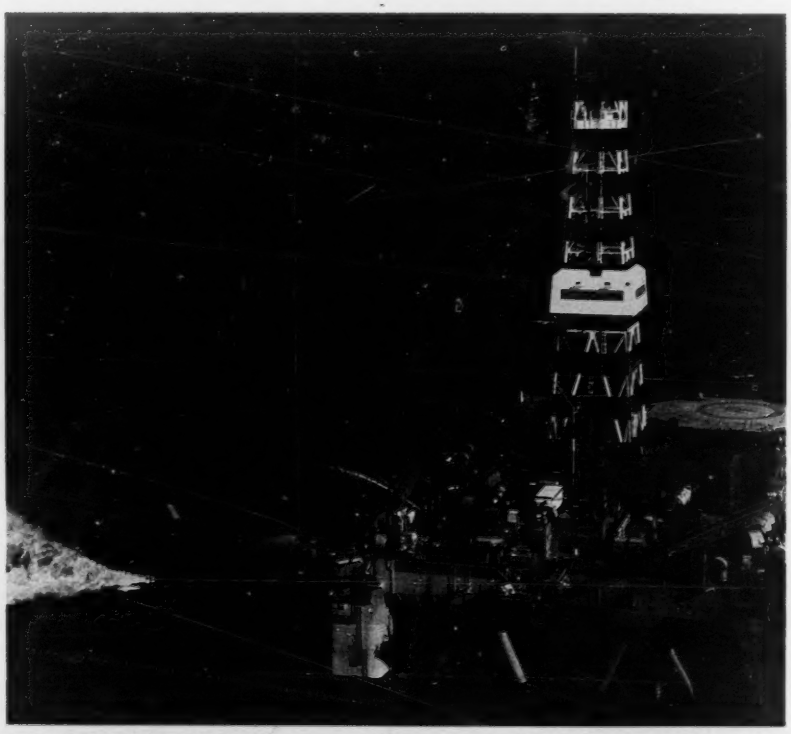
A thick accumulation of southeast trending Mesozoic and Cenozoic carbonate rocks and evaporite deposits dominates the eastern Gulf of Mexico Continental Margin, or West Florida Shelf. This area has not been influenced by the massive terrigenous regime to the extent that other parts of the gulf have. So the hydrocarbon potential of the eastern gulf is not believed to be great.

About 25 tests have been drilled in the eastern gulf of Mexico, but there is no offshore production. Production occurs onshore in the South Florida basin from the Lower Cretaceous Sunniland and in the Florida Panhandle from Jurassic sediments. Possible source rocks in the eastern gulf are mainly marine shales and organic rich carbonates, ranging in age from Jurassic to Cretaceous. Cenozoic rocks may be important sources in deeper water, said an MMS report.

Possible reservoir rocks range in age from Jurassic to Cretaceous.

Jurassic reservoir rocks are mainly grain supported wackestones, packstones and grainstones, dolomites, and mudstones. Prospective Cretaceous reservoir rocks are deltaic and turbidite sandstones, carbonate reefs that developed on the landward side of positive blocks, and shell zones.

There are many potential traps, including anticlines, faulted anticlines, structural closure against normal and growth faults, and a variety of stratigraphic and reef traps. PE



DISCLOSED late in 1985, this discovery added to a growing list of oil and gas strikes in the gulf's deepwater Flexure trend. Penrod Drilling Co.'s Penrod 76 semisubmersible drilled the well in about 2,200 ft of water on Green Canyon Block 31 for a group led by Placid Oil Co. It flowed 3,014 b/d of 49.6° gravity oil and 16.25 MMcfd of gas through $^{42}/_{64}$ in. choke with 4,145 psi flowing tubing pressure from Pleistocene perforations at 10,290-356 ft.

State	No. Radiosondes
Alabama	3
Alaska	4
Arizona	1
Arkansas	4
California	30
Colorado	3
Delaware	1
Georgia	2
Hawaii	2
Illinois	8
Indiana	5
Kansas	7
Kentucky	2
Louisiana	10
Maryland	1
Michigan	4
Minnesota	2
Mississippi	5
Montana	6
Nevada	1
New Jersey	5
New Mexico	9
North Dakota	2
Ohio	5
Oklahoma	5
Oregon	1
Pennsylvania	8
Tennessee	1
Texas	33
Utah	6
Virginia	1
Washington	7
West Virginia	2
Wisconsin	1
Wyoming	8

Province	No. Radiosondes
Alberta	6
British Columbia	6
Manitoba	1
New Brunswick	1
Newfoundland	1
Northwest Territories	1
Nova Scotia	2
Ontario	6
Quebec	4
Saskatchewan	2

working for tax reform legislation aimed in part at reducing a budget deficit of more than $200 billion.

On balance, the latest version called for higher taxes than would have been imposed under the administration's Treasury I and Treasury II plans but not as high as the committee staff plan had called for.

Oil industry reaction to the committee bill was strongly negative, particularly to a 25% alternative minimum tax it would impose.

The American Petroleum Institute (API) said Congress had determined that the petroleum industry is one of the most heavily taxed in the U.S., without including the "windfall profits" tax. When that measure was included, no American industry was as heavily taxed, it said.

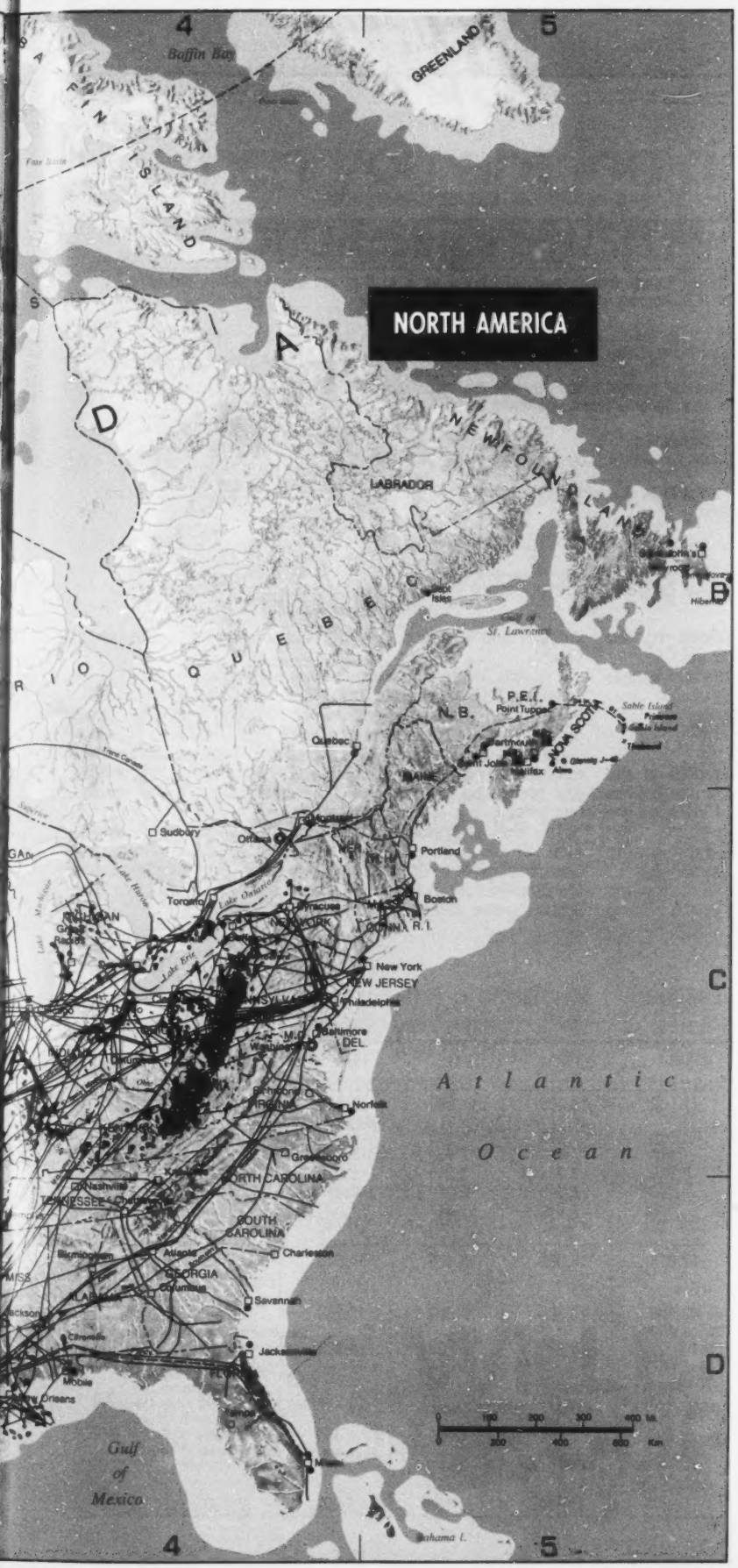
"Given those facts, we are deeply disturbed by the House ways and means committee action, which would tax the petroleum industry another $4.2 billion during 5 years. This is a step in the wrong direction for the country.

"Increased domestic petroleum development should be a national goal. Actions presenting new obstacles to productivity and inhibiting capital investment run directly contrary to that goal."

API said 21 leading oil companies paid a 37% effective federal tax rate in 1984, compared with only 22% for U.S. nonoil industrial companies (Table 1).

The oil companies' effective federal tax rate, including income and windfall profits taxes, was higher than the average of the nonoil companies throughout 1980-84.

API's study found that the 21 oil companies paid federal, state, and local taxes



Legend

- Oil field
- Oil shale
- Oil sands
- Gas field
- Crude oil pipeline
- Natural gas pipeline
- Product pipeline
- Pipelines planned or under construction
- Pump station
- Refinery in operation
- Tanker terminal
- Cities
- Capital
- International boundaries
- State and provincial boundaries
- Water depth 0 to 200 meters
- 200 metes and deeper

totaling more than $29 billion in 1984. Their federal income and windfall profits taxes of $8.8 billion that year accounted for about half of the $17.7 billion in operating taxes paid by the companies. State and local income taxes, property taxes, severance taxes, payroll taxes, and other taxes accounted for the other half.

The remaining $11.5 billion in the $29.2 billion total came from products excise taxes.

The Independent Petroleum Association of America (IPAA) estimated that small producers and royalty owners would bear about half the $4.2 billion the ways and means committee bill would cost the industry.

Because of its treatment of intangible drilling costs and the alternative minimum tax, enactment of the bill would penalize operators who were doing the most to find oil and gas, said Harold B. Scoggins, IPAA president-elect.

If operators avoided exploration and simply produced their reserves, they would be winners. But under the alternative minimum tax, "the more you drill, the more tax you pay," Scoggins said.

The measure required approval by the full House and Senate and the signature of Reagan.

Table 1

How oil and nonoil tax burdens compare

	Average 1980-84	1984	1983	1982	1981	1980
Current federal income and WPT taxes as % of U.S. net income before provision for U.S. income and WPT taxes						
Oil companies	43	37	39	44	49	41
Nonoil companies	22	22	21	21	23	25
Estimated current federal income tax as % of U.S. net income before provision for U.S. income taxes, assuming no WPT						
Oil companies	29	25	26	28	30	34
Nonoil companies	22	22	21	21	22	25
Current federal income tax as % of U.S. net income before provision for U.S. income taxes						
Oil companies	23	18	19	20	22	31
Nonoil companies	22	22	21	21	23	25

Source: American Petroleum Institute

Superfund bill

More taxes loomed for the downstream segment of the industry in December 1985 when the House of Representatives approved a $10 billion Superfund bill that would increase the petroleum feedstock tax from 0.79¢/bbl to 11.9¢/bbl.

Oil industry associations and companies were quick to condemn the House action.

It would raise refinery and chemical feedstock taxes from the current $1.14 billion to $3.1 billion during 5 years for the refining industry and $2 billion for the chemical industry in the next 5 years.

The bill, written by Rep. Thomas Downey (D-N.Y.), also called for $2 billion from a toxic waste disposal tax, $1.76 billon from the U.S. Treasury, and nearly $2 billion from other taxes during the next 5 years.

Downey said refinery and chemical feedstock taxes are reliable and easily administered and 93% of hazardous wastes are generated by chemical, petroleum, and metal related industries.

The legislation, subject to reconciliation with a Senate Superfund bill and signing by the President, would reauthorize the Comprehensive Environmental Response, Compensation, and Liability Act (the Superfund), which outlined the nation's hazardous waste cleanup program.

Table 2

Estimate of U.S. gas consumption, imports, and required domestic production

	1984	1985	1986	1987	1988	1989	1990
	bcf						
Domestic consumption	17,489	17,500	17,500	17,500	17,500	17,500	17,500
Plus exports and unaccounted for losses	517	520	520	520	520	520	520
Less supplemental supplies	138	140	140	140	140	140	140
Plus additions to storage	2,249	2,215	2,215	2,215	2,215	2,215	2,215
Less withdrawals from storage	2,038	2,040	2,040	2,040	2,040	2,040	2,040
Less imports-Canada	769	940	1,026	1,377	1,503	1,665	1,665
Mexico and other	92	40	40	40	40	40	40
Required domestic production	17,218	17,075	16,989	16,638	16,512	16,350	16,350
Deliverability of domestic reserves as of Dec. 31, 1983	20,500	18,500	16,500	14,500	12,250	10,250	8,250
Less requirements from domestic production	17,218	17,075	16,989	16,638	16,512	16,350	16,350
Surplus (shortfall) of production from Dec. 31, 1983, reserves	3,282	1,425	(489)	(2,138)	(4,262)	(6,100)	(8,100)
Less required operational cushion	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Surplus (shortfall) of production from Dec. 31, 1983, to be made up by drilling	2,282	425	(1,489)	(3,138)	(5,262)	(7,100)	(9,100)

Source: Morgan Stanley & Co.

Table 3

Drilling required to meet gas shortfall

Required discoveries	Case 1 No growth in consumption	Case 2 1%/year growth in consumption	Case 3 2%/year growth in consumption
	bcf		
1986	14,890	17,160	20,610
1987	17,980	19,610	21,800
1988	24,380	26,410	28,850
1989	23,640	25,820	28,480
1990	27,090	29,630	32,590
Total	**107,980**	**118,630**	**132,330**
Less amount discovered by 1984 base level drilling*	73,500	73,500	73,500
Amount that must be found by increase in drilling above 1984 level	34,480	45,130	58,830
Footage required at finding rate of 80.2 Mcf/ft (1,000)	429,925	562,718	733,541
Annual footage required assuming increase does not start until 1986 (1,000)	85,985	112,544	146,708
Increase in rigs at drilling rate of 120,000 ft/rig/year	717	938	1,223

*10 tcf/year.
Source: Morgan Stanley & Co.

Table 4

U.S. rig activity required to meet gas shortfall

	Case 1	Case 2	Case 3
1985	2,375	—	—
1986	2,614	2,688	2,783
1987	2,853	3,001	3,191
1988	3,092	3,314	3,599
1989	3,331	3,627	4,007
1990	3,570	3,940	4,415

Source: Morgan Stanley & Co.

and the Texas Panhandle, about 50% in Oklahoma and Kansas, and 60-85% in North Texas and New Mexico.

The median weighted average wellhead price was $2.65/Mcf.

Half of the respondents sold more than half of their gas to interstate pipeline systems, while the other half sold most of their gas directly to end users or to intrastate systems.

As a result of the surplus, many pipelines renegotiated wellhead purchase contracts to trim prices and takes. Others invoked market out clauses to halt purchases because the gas could not be resold at contract purchase prices.

The long slide in wellhead prices—from as much as $10/Mcf in new purchase contracts for deep, deregulated gas in 1981—took its toll of deep drilling.

A prime example was the central Anadarko basin of western Oklahoma as well as the Texas Panhandle, where gas pay zones generally occur below 15,000 ft. Well completions and footage in the area plummeted from record levels of 1982 (Fig. 1).

The slide in U.S. industry's capital outlays* 4

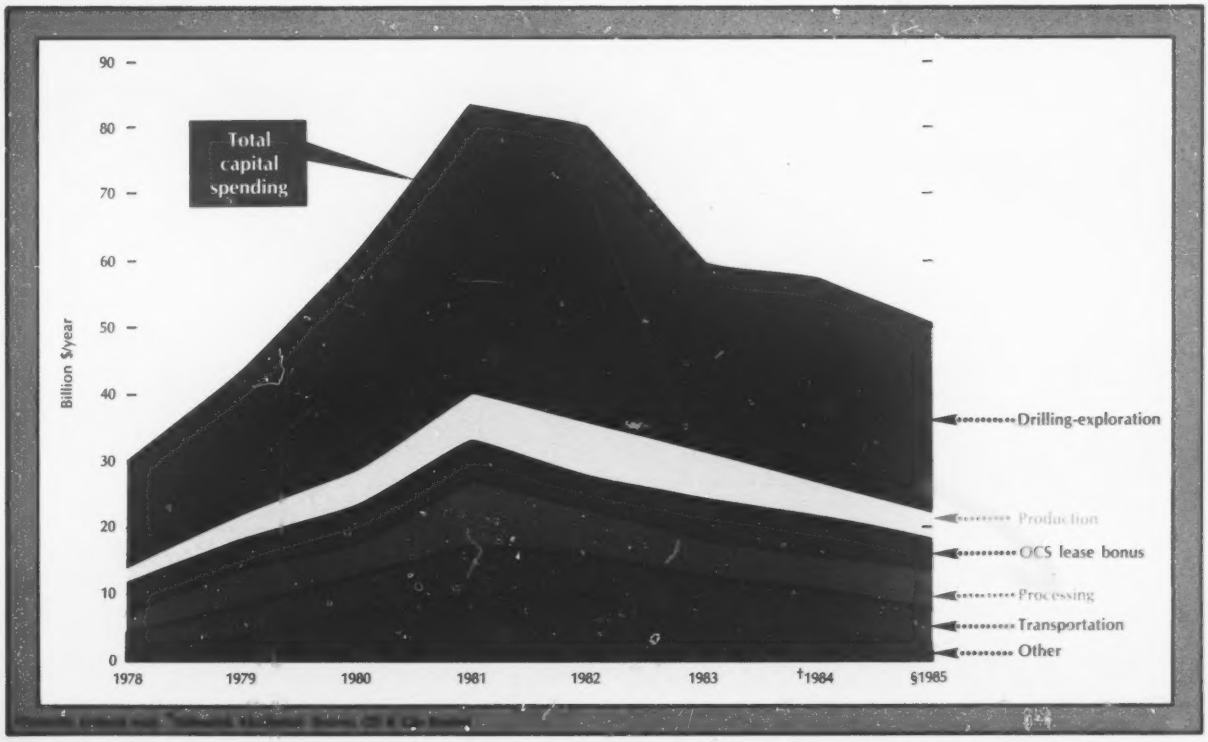


Table 5

How cogeneration filings at FERC have increased*

Fuel	1980 Number of fillings	1980 Capacity (kw)	1981 Number of fillings	1981 Capacity (kw)	1982 Number of fillings	1982 Capacity (kw)	1983 Number of fillings	1983 Capacity (kw)	1984 Number of fillings	1984 Capacity (kw)	First quarter 1985 Number of fillings	First quarter 1985 Capacity (kw)
Natural gas	4	146,250	10	86,589	43	2,148,227	74	2,256,838	114	1,929,004	44	2,716,519
Coal	3	88,000	3	634,500	9	290,891	23	925,559	22	1,021,030	9	529,713
Biomasss	2	86,400	6	98,593	22	421,450	22	385,739	29	519,147	9	248,755
Waste	1	75,000	0	—	2	74,300	2	228,000	6	480,875	0	—
Fuel oil	2	28,300	0	—	4	16,699	6	92,098	9	63,030	5	26,810
Other†	1	19,500	3	60,280	3	572,475	3	15,450	5	107,000	2	86,300
Total	**12**	**443,450**	**22**	**879,962**	**81**	**3,524,012**	**128**	**3,903,684**	**184**	**4,120,086**	**69**	**3,590,097**

*Fiscal year, October-September. †Includes nuclear and solar fuels.
Source: Federal Energy Regulatory Commission

When will it end?

Estimates of when the gas surplus will end varied widely, with some forecasters saying the bubble will last throughout the 1980s. But one firm, Morgan Stanley & Co., predicted that an end to the gas bubble will trigger an upturn in U.S. drilling in second half 1986. The drilling recovery, driven by a prolonged slump in gas reserves, will continue the rest of the decade, the company said.

It forecast a growing shortfall in required U.S. production starting in 1986, even if there is no increase in demand during the 1980s (Table 2).

The shortfall in U.S. supply will be an inevitable result of the long term trend in gas reserves, which have declined more than 40% since peaking in 1967, Morgan Stanley said.

Rising demand, coupled with falling reserves and productive capacity, led to shortages in the 1970s. The slump in demand and the drilling surge of the early 1980s quickly changed shortage to surplus. But the bubble was fast disappearing, Morgan Stanley said, with the sharp decline in drilling for gas and the discovery rate. And the shortfall in domestic production will grow to 9.1 trillion cu ft in 1990 unless there is a substantial increase in drilling.

Now, the firm said, industry must start finding gas that will be produced and consumed in the future.

During 1986-90, industry must find 34.48 tcf of gas in addition to reserves expected from continuing gas well drilling at 1984 levels. That is the amount needed to meet domestic production requirements with no increase in demand and with gradually rising imports.

The additional reserves required will rise to 45.13 tcf if demand grows 1%/year and 58.83 tcf with 2%/year market growth (Table 3). To meet the zero growth scenario, the additional drilling footage required during 1986-90 was calculated at 429.925 million ft, based on a finding rate of 80.2 Mcf/ft. That translates into an increase in active rigs of 717, based on productivity of 120,000 ft/rig/year (Table 4).

Coal gasification

The Department of Energy (DOE) in July 1985 vetoed a financial aid package for the Great Plains coal gasification plant, the nation's first commercial scale synthetic fuels operation. That killed the project. Great Plains owners halted their participation Aug. 1 and agreed to turn over the plant to DOE.

Great Plains, which had been producing pipeline quality gas for nearly a year, was owned 30% by Tenneco Inc., 25% by American Natural Resources Co., 20% by Transco Energy Co., 15% by MidCon Corp., and 10% by Pacific Lighting Corp.

The project's partners had said they would close the $2 billion plant near Beulah, N.D., if the government didn't refinance $1.5 billion in debt and offer some price supports.

At the request of DOE, the U.S. Synthetic Fuels Corp.

U.S. spending, drilling, finding 5

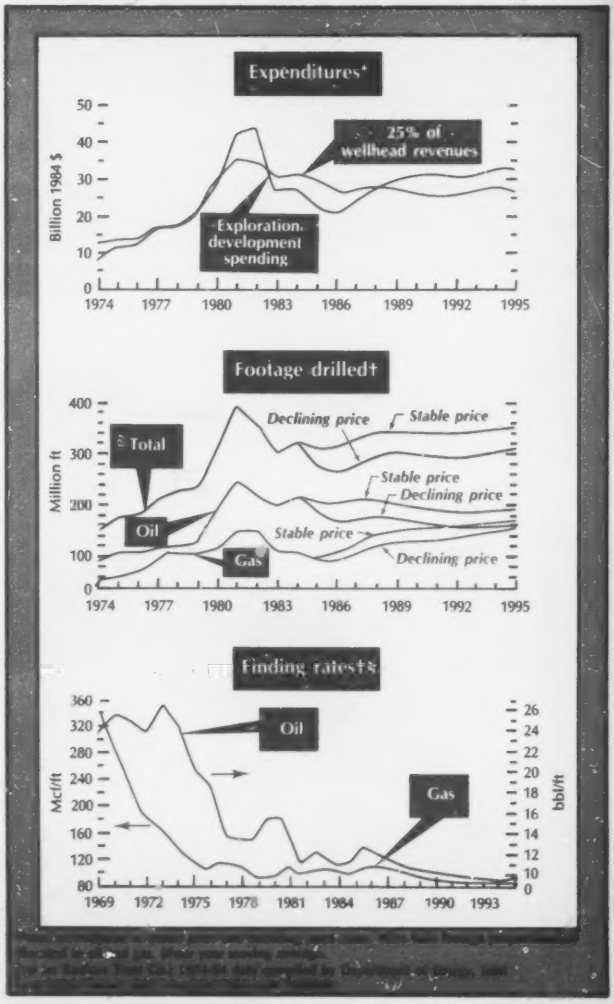


Table 6

Kern County thermal EOR/cogeneration gas demand

	EOR estimate	Incremental cogeneration	Total*
	MMcfd		
WESTERN KERN COUNTY			
Lost Hills	5	1	6
South Belridge	120	†60	†180
Cymric/McKittrick	65	1	66
Midway-Sunset	160	60	220
Subtotal	**350**	**122**	**472**
EASTERN KERN COUNTY			
Mount Poso	40	0	40
Poso Creek	5	0	5
Kern Front	5	3	8
Kern River	420	75	495
Edison	3	0	3
Subtotal	**473**	**78**	**551**
Total	**825**	**200**	**1,025**
Locally produced gas	-150	0	-150
Nonconvertible oil	-125	0	-125
Subtotal	**-275**	**0**	**-275**
Net demand	**550**	**200**	**750**

*Totals may not add due to rounding. †Includes Petro-Lewis combined cycle plant.
Source: Southern California Gas Co.

FERC had been besieged by requests for exceptions and clarifications of various aspects of the order, which eased regulations on lines that transported gas in direct producer-consumer contracts. Any gas pipeline that chose to operate under the rule was required to move gas for any customer.

Order 436 went into effect Nov. 1 after a Washington, D.C., circuit court of appeals rejected attempts to block it. Pipelines had complained that operating under the rule would make them common carriers without providing relief from take or pay provisions in contracts.

FERC denied requests by the Interstate Natural Gas Association of America (Ingaa), AGA, and various pipelines to stay its rule.

It explained it did not see how Order 436 would cause irreparable harm to the industry because it only ended special marketing programs (SMPs) the appeals court had struck down effective

Table 7

Depth rating (ft)	Number of rigs
3,000-5,000	529
6,000-9,000	1,084
10,000-12,000	894
13,000-15,000	570
16,000+	1,332
Total	**4,409**

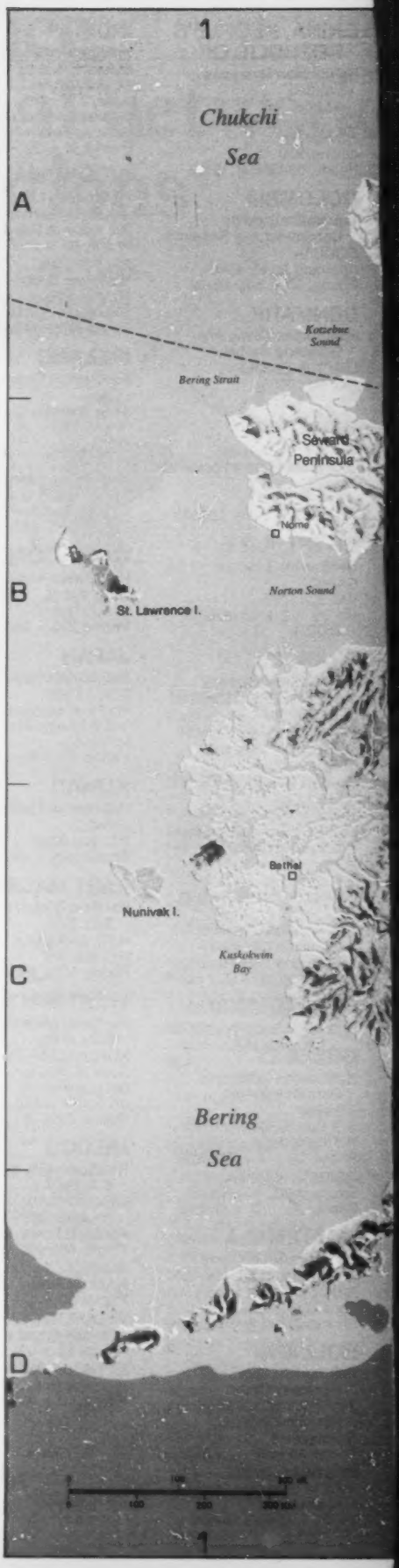
Source: Reed Tool Co.

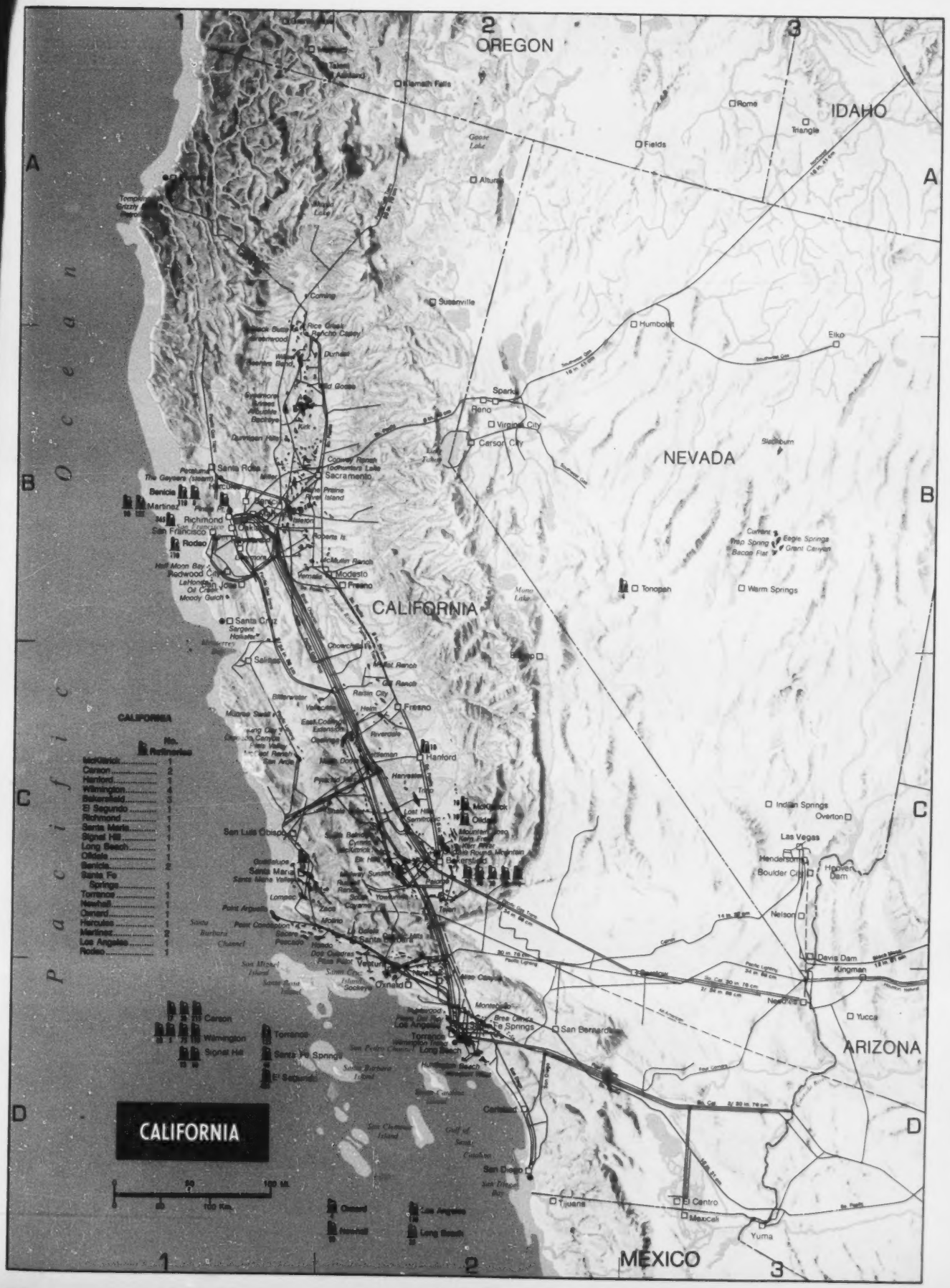
Table 8

What could happen to crude oil prices*

	1982	1984	1985	1987	1990	1995	†Percent change 1985-95
LOW							
Current $/bbl ..	34.00	29.00	28.00	15.00	20.00	26.00	-0.74
1985 $/bbl	38.57	30.13	28.00	14.28	16.68	16.67	-5.05
MOST LIKELY							
Current $/bbl ..	34.00	29.00	28.00	23.00	23.00	30.78	+0.95
1985 $/bbl	38.57	30.13	28.00	21.47	18.55	18.55	-4.03
HIGH							
Current $/bbl ..	34.00	29.00	28.00	26.00	26.00	36.47	+2.68
1985 $/bbl	32.57	30.13	28.00	24.27	20.47	20.47	-3.08

*Yearend price for Arab light. Different inflation rates assumed under different scenarios.
†Compound yearly average.
Source: Ashland Oil Inc.




OREGON
IDAHO
NEVADA
CALIFORNIA
ARIZONA
MEXICO
Pacific Ocean
CALIFORNIA
CALIFORNIA
No. Refineries
McKittrick 1
Carson 2
Hanford 1
Wilmington 4
Bakersfield 3
El Segundo 1
Richmond 1
Santa Maria 1
Signal Hill 1
Long Beach 1
Ofiate 1
Benicia 2
Santa Fe Springs 1
Torrance 1
Newhall 1
Oxnard 1
Hercules 1
Martinez 2
Los Angeles 1
Rodeo 1
Klamath Falls
Rome
Fields
Triangle
Alturas
Susanville
Humboldt
Elko
Sparks
Reno
Virginia City
Carson City
Stockburn
Santa Rosa
Sacramento
Benicia
Martinez
Richmond
San Francisco
Rodeo
Modesto
Fresno
Santa Cruz
Salinas
Hanford
Bakersfield
San Luis Obispo
Santa Maria
Lompoc
Ventura
Oxnard
Long Beach
Torrance
Santa Fe Springs
Carson
Wilmington
Signal Hill
San Bernardino
San Diego
Tijuana
El Centro
Mexicali
Yuma
Indian Springs
Overton
Las Vegas
Henderson
Boulder City
Hoover Dam
Nelson
Davis Dam
Kingman
Needles
Yucca
Tonopah
Warm Springs
Eagle Springs
Grant Canyon
Tropico
Mojave
Palmdale
Lancaster
Victorville
Barstow
Daggett
Blythe
Indio
Palm Springs
Riverside
Ontario
Pomona
Los Angeles
Pasadena
Burbank
Glendale
Santa Barbara
Oxnard
Ventura
Lompoc
Point Arguello
Point Conception
Point Pinos
Monterey
Salinas
Watsonville
Santa Cruz
Half Moon Bay
Redwood City
Oakland
Richmond
Martinez
Benicia
Vallejo
Napa
Santa Rosa
Petaluma
Point Reyes
Eureka
Arcata
Crescent City
Redding
Weed
Dunsmuir
Mount Shasta
Yreka
Alturas
Susanville
Chico
Oroville
Marysville
Sacramento
Stockton
Modesto
Merced
Fresno
Hanford
Visalia
Bakersfield
Taft
Maricopa
Coalinga
Lemoore
Kettleman City
Avenal
Paso Robles
Atascadero
San Luis Obispo
Guadalupe
Santa Maria
Lompoc
Point Arguello
Point Conception
Santa Barbara
Channel Islands
San Miguel Island
Santa Rosa Island
Santa Cruz Island
Anacapa Island
Santa Barbara Island
San Clemente Island
Catalina Island
Gulf of Santa Catalina
San Pedro Channel
Santa Barbara Channel
Point Dume
Point Mugu
Point Hueneme
Point Fermin
Huntington Beach
Newport Beach
Laguna Beach
Dana Point
San Clemente
Oceanside
Carlsbad
Encinitas
La Jolla
San Diego
San Ysidro
Otay Mesa
Calexico
Brawley
El Centro
Mexicali
Yuma
Blythe
Needles
Barstow
Victorville
San Bernardino
Riverside
Ontario
Pomona
Los Angeles
Pasadena
Burbank
Glendale
Long Beach
Torrance
Santa Fe Springs
Carson
Wilmington
Signal Hill

vember, down from 225 MMcfd in October.

The Process Gas Consumers Group complained to a congressional hearing that many nonparticipating pipelines had cut off transportation services to customers with alternate fuel capability with a "devastating" effect.

"Some of our member companies are paying in excess of $400,000/month over what they were paying for gas prior to Oct. 31 because of the need to substitute the pipeline's high priced gas for user-owned gas," the group said.

Cogeneration market

Demand for natural gas as fuel for cogeneration plants continued to rise in 1985.

Such plants produce electricity, usually for sale to utilities, and steam for hydrocarbon processing or TEOR. Most are on the Texas Gulf Coast and in California.

FERC logged 44 applications for certification as gas fired cogeneration plants during the first quarter of the commission's fiscal 1985 (Table 5).

Capacity of those gas fired plants was 2,716,519 kw, representing more than 135 billion cu ft/year of gas demand.

By comparison, capacity of the 114 gas fired cogeneration plants that filed qualification applications during all 12 months of fiscal 1984 was 1,929,004 kw.

A FERC report showed that gas fired turbines were becoming an increasingly popular cogeneration technology. Filings for gas fired plants rose to 114 in fiscal 1984, compared with only four in fiscal 1980.

The largest natural gas fired cogeneration application in fiscal 1985's first quarter period came from HNG/InterNorth Inc.'s Northern Natural Resources Co.

Northern's plans called for construction and operation of Northern Cogeneration One southeast of Houston. Although Northern's filing was for a 441,000 kw plant, the company later downgraded capacity to 430,000 kw.

The FERC report showed that coal and biomass fired cogeneration plants also continued to gain in popularity, although not at the pace of gas fired cogeneration plants.

TEOR market

Expansion of TEOR operations in California's San Joaquin Valley had several companies locked in a struggle to serve North America's biggest potential incremental natural gas

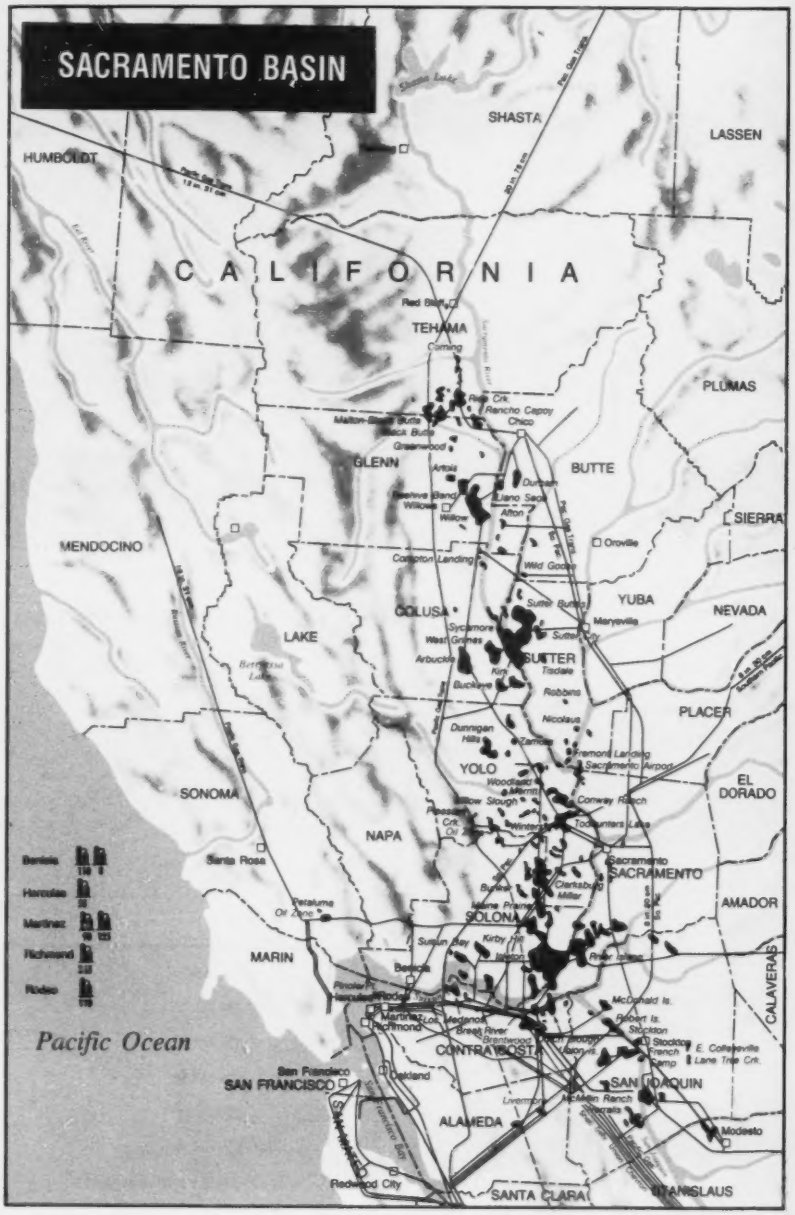


Table 9

Oil, gas price outlook

	1984	1985	1986	1990	1995
			$/bbl		
CRUDE OIL					
Stable	25.87	24.90	25.50	32.20	46.50
Declining	25.87	23.70	22.50	28.50	41.00
			$/bbl		
NATURAL GAS					
Stable	2.63	2.60	2.70	3.50	6.00
Declining	2.63	2.55	2.45	3.40	6.00

Source: Bankers Trust Co.

lower oil and gas prices. Refining/marketing earnings generally improved.

Industry earmarked $50.049 billion for its 1985 U.S. capital and exploration budget, down 12.5% from estimated 1984 outlays. It was the fourth straight year of declines in spending (Fig. 4).

As usual, drilling/exploration claimed most of the budget—70% in 1985—as planned spending in that category slipped 12.3% to $34.968 billion.

An upswing?

A midyear 1985 report by Bankers Trust Co., New York, predicted that U.S. drilling expenditures will remain depressed through 1986, then rise substantially during the remainder of the 1980s (Fig. 5).

But the increase, in 1984 dollars, will not match the spike that occurred during 1980-81, the bank said.

Drilling outlays will remain low in the short term due to uncertainty about prices, the threat of increased taxes, a limited supply of external funds, and an increase in overseas spending.

But in the long term, some of those factors will not influence spending for exploration/development drilling costs as much as they did in 1985. The industry will be restructured due to company reorganizations caused by price decreases, excessive producing and refining capacity, and corporate raiders.

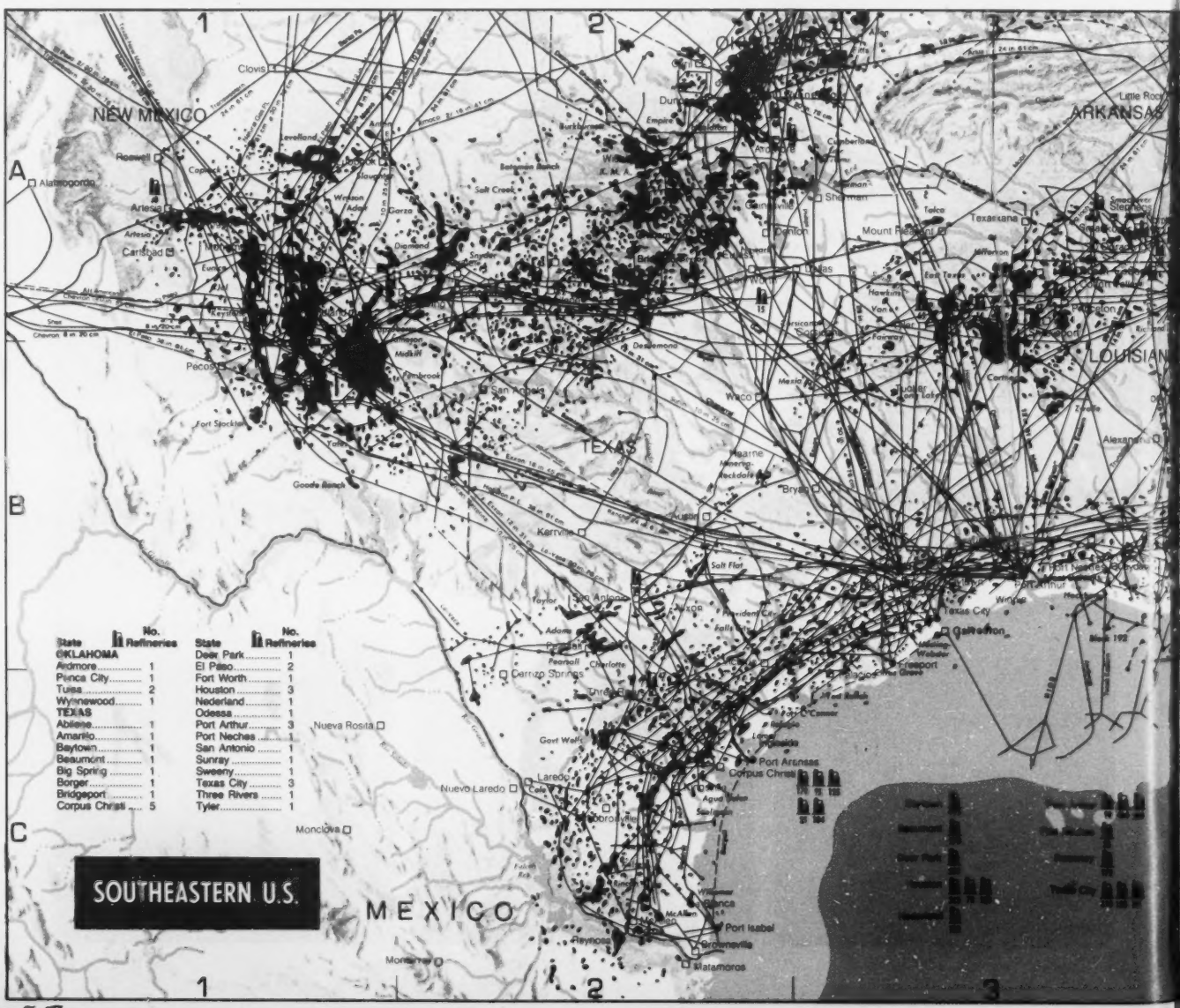
U.S. drilling outlays could rise to $35-45 billion in 1990 and $60-65 billion in 1995, Bankers Trust predicted. Broken down, natural gas drilling spending could reach $35-37 billion by 1995, while oil drilling outlays might be as much as $23-25 billion.

During the previous decade, producers reinvested 25% of oil and gas wellhead revenues in drilling.

The plowback percentage declined with hard times. But it is expected to rise again and exceed 25% because international markets will be tighter, prices will stabilize, and gas drilling will increase.

Plowback percentage always has been higher for gas than for oil, the bank said. Through 1986, oil drilling activity will remain sluggish due to a less attractive rate of return on exploration/development and flat wellhead revenues.

Oil prices may rise with inflation in the late 1980s, but



finding costs will increase faster than inflation, partly because exploration will occur in more expensive areas.

With the uncertainty of future prices, the bank used two cases—stable price and declining price—to predict long term drilling expenditures (Table 9).

With stable prices, oil drilling will average about 190 million ft by 1995, twice the level of the mid-1970s but 20% below its 1981 peak.

In the declining price case, oil drilling will average about 155 million ft, 50% more than the mid-1970s level but 35% less than 1981 activity.

On the other hand, gas drilling will rise significantly because of increased wellhead prices foreseen in both cases. U.S. demand will average 17.5-18 tcf/year during the next decade, the bank predicted. That will help wipe out the gas bubble in the late 1980s, according to the bank's calculations.

As a result, average wellhead price will rise to $6/Mcf in 1995 from about $2.60/Mcf in 1984 and about $3.60/Mcf in 1990 in the stable price case.

Gas drilling will reach 150 million ft/year by 1990, regaining the peak of the early 1980s. In the declining price case, outlays for gas drilling will rise to $20 billion in 1995, double the level expected in 1985.

Mergers, restructuring

A broad restructuring of the U.S. petroleum industry continued in 1985 with stock buybacks, mergers, and asset sales under way on a wide front. Here are some of the year's highlights:

February

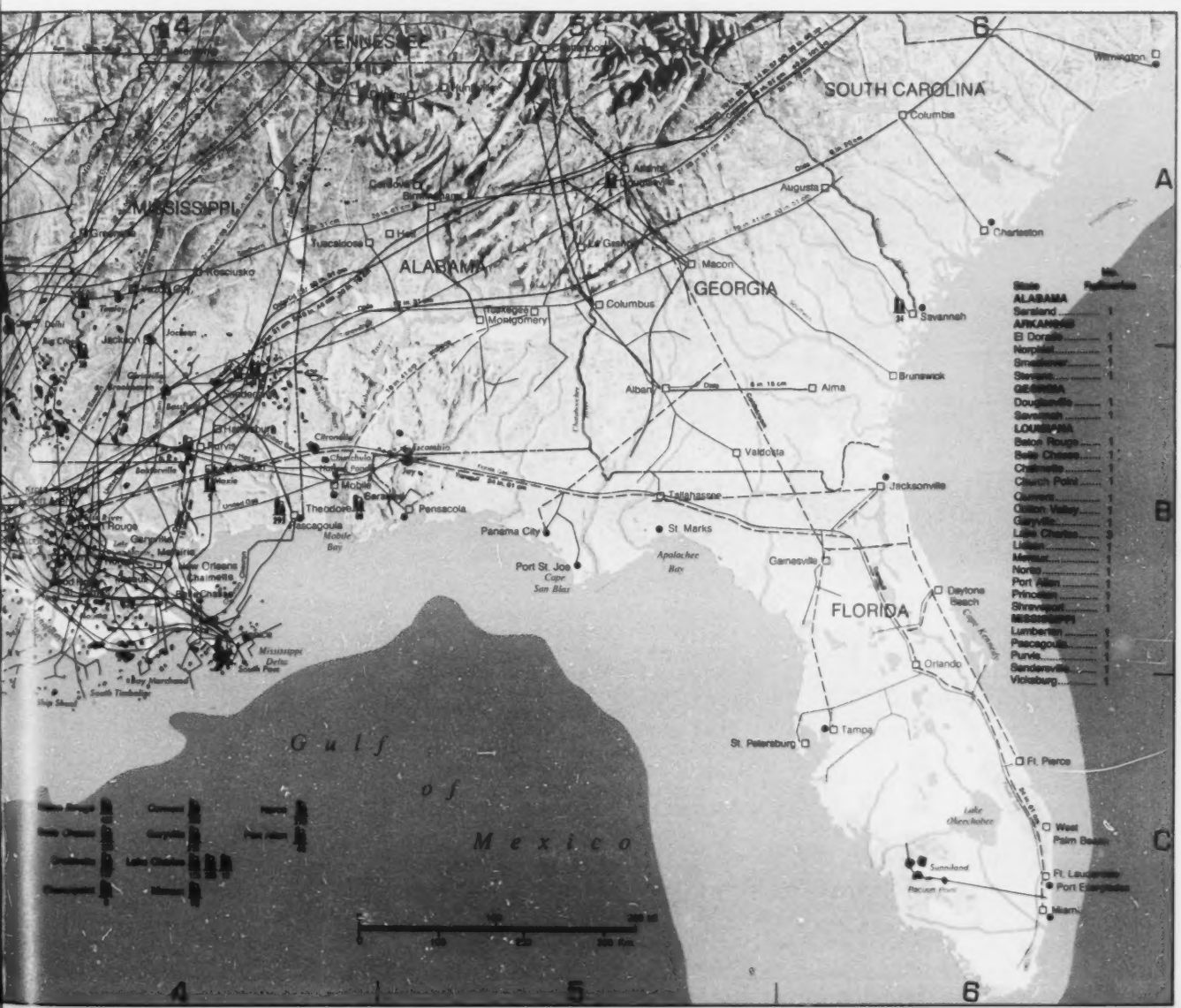
• Coastal Corp. signed a definitive agreement to acquire American Natural Resources Co. for $65/share of ANR stock. The companies reached the $2.45 billion agreement after ANR asked a federal judge in Detroit to block Coastal's $2.3 billion, $60/share tender offer for all of ANR's outstanding stock.

March

• The Federal Trade Commission cleared the way for the merger of Gulf Corp. into Chevron Corp. FTC lifted its "hold separate" restrictions it had imposed in April 1984 and approved divestiture of Gulf's interest in Colonial Pipeline Co.

April

• Atlantic Richfield Co. disclosed plans for a sweeping



CANADA

CAPITAL: Ottawa
MONETARY UNIT: Dollar
REFINING CAPACITY: 1,868,534 b/cd
PRODUCTION: 1.453 million b/d
RESERVES: 7 billion bbl

THE CANADIAN PETROLEUM INDUSTRY ENTERED 1986 poised for another banner year in exploration/development.

Fueling the industry's enthusiasm were decontrol of crude oil prices, market oriented natural gas prices, and rising exports of oil and gas to the U.S.

All resulted from junking of the national energy program (NEP) imposed by the Liberals in October 1980 during Pierre Trudeau's administration.

Pat Carney, minister of energy, mines, and resources, underscored the effect of Ottawa's new policies in an address to the November 1984 annual meeting of the American Petroleum Institute (API) in San Francisco.

She said federal energy policy changes have greatly improved the regulatory climate for producers in Canada. And she had a simple message for API: Canada, with its new federal energy policy, now welcomes oil and gas producers.

The energy agenda of the 14 month old administration of Progressive Conservative Prime Minister Brian Mulroney was almost complete, Carney said. It had replaced the Liberals' NEP with a program much more oriented to the market.

Key initiatives were dismantlement of NEP taxes and price controls, federal-provincial agreements called the Western and Atlantic accords, a new frontier policy covering offshore and Arctic areas, and a new agreement on natural gas prices and markets.

The Mulroney administration followed these concepts in overhauling Canada's energy policy, Carney said:

- The petroleum industry is in the business of drilling for oil and gas and needs funds to invest, markets for its products, and opportunities for profit.
- In "the right policy environment," oil and gas companies will reinvest at rates higher than those of most other industries.
- Non-Canadian investment is important to Canada's economy.
- Canadian energy should not be a source of confrontation between levels of government and regions.

Relaxation of natural gas export restrictions was based on Canada's ability to offer the U.S. "an important and abundant source of alternative supply," the energy minister said.

She earlier called NEP "one of the most divisive, discriminatory programs in Canadian history."

The former program provided grants for frontier exploration, controlled prices on production from conventional areas, and generally favored Canadian owned companies over non-Canadian firms.

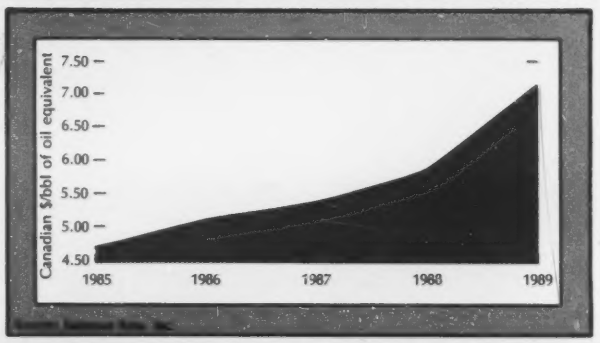
New energy policy

Canada's revamped energy policy aims to provide greater incentives for exploration, streamline regulations, and improve the federal royalty scheme.

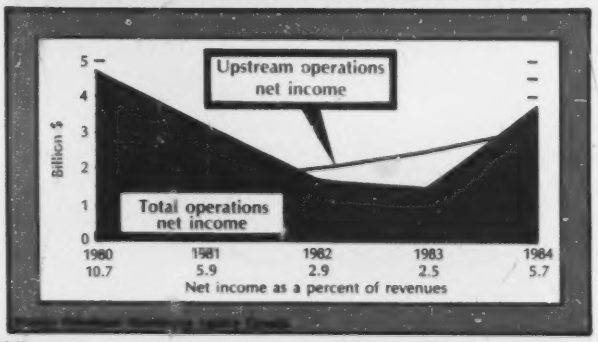
Key changes in policy covered taxes and frontier exploration/development. Officially unveiled in October 1985, they included:

- A proposal for a Canadian Resources Act to replace the "arbitrary" powers in the current Canada Oil and Gas Act.
- A refundable 25% investment tax credit for all exploration expenses exceeding $5 million/well anywhere in Canada.

How Canadian netback will increase 1



How Canadian profits rebounded 2



Revenue shares 3

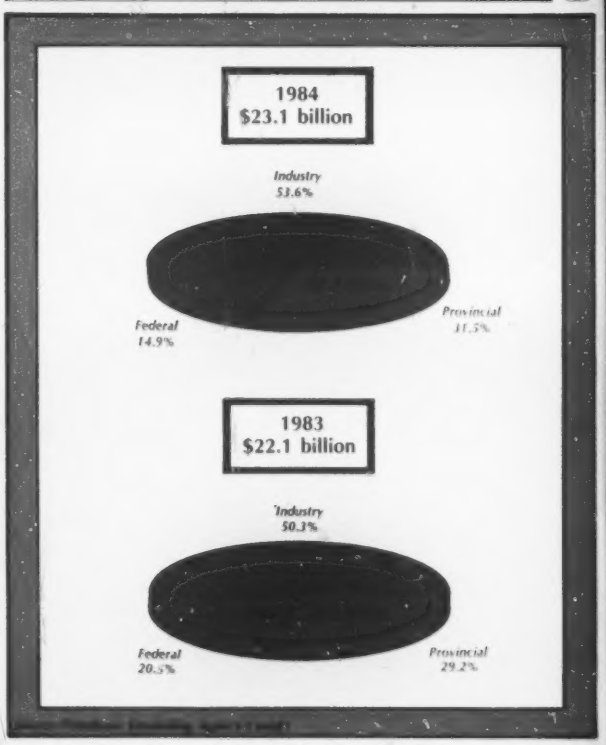


Table 1

Breakout of Canada's biggest producers*

Rank		Crude oil, gas liquids (1,000 b/d)	Rank		Natural gas (MMcfd)
1	Texaco Canada†	152	1	Dome Petroleum	548
2	Imperial Oil†	149	2	Shell Canada Resources†	512
3	Gulf Canada†	120	3	Petro-Canada	381
4	Dome Petroleum	118	4	Amoco Canada Petroleum†	355
5	Petro-Canada	105	5	Mobil Oil Canada†	353
6	Chevron Canada Resources†	93	6	PanCanadian Petroleum	345
7	Mobil Oil Canada†	86	7	Gulf Canada†	310
8	Amoco Canada Petroleum†	75	8	Imperial Oil†	233
9	Shell Canada Resources†	72	9	Alberta Energy Co.	222
10	PanCanadian Petroleum	65	10	Chevron Canada Resources†	194
11	Suncor†	62	11	Canadian Superior†	179
12	Husky Oil	43	12	Canterra Energy	173
13	Norcen Energy Resources	35	13	Norcen Energy Resources	131
14	Canadian Superior†	34	14	Texaco Canada†	127
15	Canterra Energy	30	15	Canadian Hunter	105
16	Home Oil Co.	27	16	Home Oil Co.	104
17	Canadian Occidental†	22	17	BP Canada†	103
18	Union Oil of Canada†	22	18	Ocelot Industries	103
19	BP Canada†	19	19	Sulpetro Ltd.	103
20	Saskatchewan Oil & Gas	14	20	TCPL Resources	80

*Gross production in 1984. †Subsidiary of a foreign company.

Source: Salomon Bros. calculations from Oilweek data

650 bcf in the 1985-86 contract year from an estimated 900 bcf in the contract year ended Oct. 31, 1985.

Officials said they believe prices will decline, but exports will increase at least 20% to about 1.1 tcf/year. Half of the projected increase likely will be in longer term contracts at an average price of $2.92 (U.S.)/Mcf and the rest in spot sales at an average $2.25 (U.S.)/Mcf.

Average price for all exports at the time of the agreement was about $3.25 (U.S.)/Mcf.

During a 1 year transition period, the wholesale price of gas at Toronto was to be frozen at about $3.99 (Canadian)/Mcf.

When the transition period ends, price of all natural gas will be set in negotiations between buyers and sellers. Major buyers will be able to buy gas directly from producers.

Natural gas buyers were to be able to start using the new system immediately if producers agreed.

Carney said the new policy will ensure lower prices for consumers and better access to markets for western producers.

Frontier policy

The Canada Petroleum Resources Act was the vehicle designed to eliminate the federal government's back-in on frontier acreage. Multinational operators, which held most frontier acreage, had branded the back-in "retroactive expropriation."

The new exploration incentive is a 25% investment royalty credit applicable to costs of as much as $5 million/well.

There is a different 25% tax credit on spending of more than $5 million/well. For companies not paying federal tax against which the credit could be applied, 40% of the credit will be refundable.

The new tax credit system went into effect Dec. 1, 1985, and will end Dec. 31, 1990.

The new law still requires 50% Canadian ownership of frontier projects in the Arctic and east coast offshore when a field reaches the production stage.

Companies that plan to develop a field are required to file a plan showing how they or their groups will reach the 50% level by the time their wells are ready to produce.

If operators or groups do not reach the required level of Canadian ownership, the government may put the necessary part of the production license up for bids. In that case, either the federal or provincial governments can step in as buyers as a last resort to reach the 50% Canadian ownership level.

Carney said the price paid for such assets will never be less than an independently assessed market value. Rights may be sold in return for commitments to spend money for exploration on a license, rather than for cash.

The federal government was in the process of transferring royalty rights on offshore discoveries to provincial jurisdiction.

Table 2

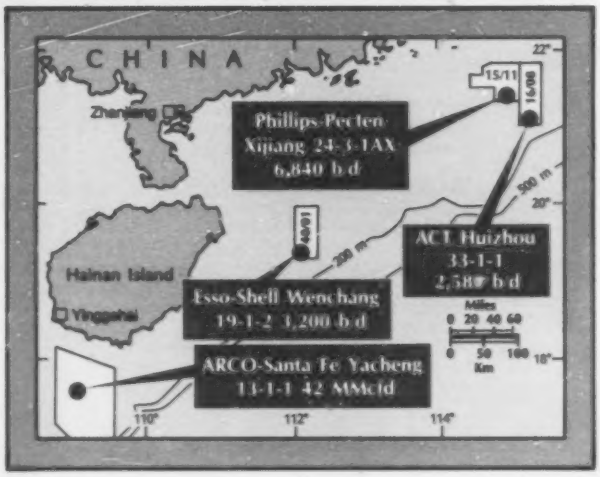
Breakout of Canadian industry's spending

	1983	1984	Change		Percent share of total	
	Billion $			%	1983	1984
Exploration	4.3	4.8	+0.5	+13	41	47
Development	1.0	1.1	+0.1	+12	9	11
Nonconventional*	0.4	0.5	+0.1	+19	4	5
Total upstream†	**5.8**	**7.7**	**+0.9**	**+14**	**65**	**76**
Downstream	1.7	1.0	−0.7	−38	17	10
Energy mining	0.2	0.2	—	− 7	2	2
All other	0.9	0.6	−0.3	−35	9	6
Total Canadian	**9.6**	**9.5**	**−0.1**	**− 1**	**93**	**94**
Expenditures abroad	0.8	0.7	−0.1	−14	7	6
Total expenditures	**10.4**	**10.2**	**−0.2**	**− 1**	**100**	**100**

*Includes oil sands and nonconventional heavy oil projects. †Includes PIP grants.

Source: Petroleum Monitoring Agency Canada

Strikes in the South China Sea



Daqing field

China plans to maintain the production level of 1.1 million b/d at least until 1990 in Daqing field, its biggest oil producer.

A large scale construction and workover program will help stabilize production in the Heilongjiang Province field, Xinhua News Agency reported. The prediction is based in part on a fairly low rate of decline in production from existing wells.

"Daqing's managers have adopted measures such as locating oil wells in dense clumps and turning natural gushers into pumped wells so as to recover more reserves," Xinhua said.

A new type of submersible electric pump has been installed on 720 wells, allowing each well to increase production by as much as 200 b/d from "the normal water injection method."

Huabei field

China has turned around a production decline in its third largest oil field.

With an additional 100 wells placed on stream, first half 1985 production amounted to 208,500 b/d in Huabei field, Hebei Province. The volume was up 2% from the same period in 1984. Only Daqing and Shengli fields produced more.

Eighty percent of Huabei's 900 wells tap a reservoir characterized by high initial production and rapid depletion, Xinhua News Agency reports.

Output fell to 203,000 b/d in 1983, down 40% from 1979. Official 1985 target was an average 206,000 b/d.

Dagang area

Output from fields in China's big Dagang area climbed during the first 7 months of 1985.

Oil production of 14.7 million bbl was 15% higher and gas flow of 12 billion cu ft was 18% higher than the same period in 1984, says Xinhua. During first half 1985, 16 new wells produced commercial flows of oil and gas at Dagang, which lies along the Bohai Sea coast near Tianjin.

Chinese geologists believe they have evidence that structures in the Dagang area are linked with those offshore, where Japan China Oil Development Corp. has field development under way.

Tibet survey

Chinese geologists have completed a national geologic map with the completion of a survey of the Gartogfu region in western Tibet.

Gartogfu, lying between 28° and 32° N. Lat., 78° and 84° E. Long., covers an area of about 386,000 sq miles with an average height of 16,400 ft.

The survey showed that the Tibet Plateau was an ocean in ancient times and rose when the Gondwana continental plate collided with the Eurasian continental plate along the Yerlung Zangbo River Valley, Xinhua News Agency reported.

"Layers of Tertiary marine facies in the northwest part of Gartogfu are the highest discovered on the Tibet Plateau and will help geologists come to a conclusion on the period of the rising of the plateau and withdrawal of the sea," Xinhua said.

The Gartogfu study included 1,300 line miles of seismic surveys and collection of 4,300 fossils and 4,500 rock samples, Xinhua said.

Offshore action

China began South China Sea acreage awards in its second round of offshore bidding by foreign operators for production sharing contracts.

The first contract in the second round went to a group of three Japanese companies.

The second went to a combine of Esso China Ltd. and Shell Exploration (China) Ltd.

Amoco Orient Petroleum Co. signed the last contract in the first round, on which bidding began in 1982.

In the second round of bidding, Cnooc received 24 bids from operators in 10 countries. Cnooc expected to sign more second round contracts before year-end 1985, the official Xinhua News Agency reported.

Second round

Japan Petroleum Exploration Co. (Japex) 40%, Huanan Oil Development Co. Ltd. 40%, and Nippon Mining Co. Ltd. 20% signed the second round contract with Cnooc for Contract Area 16/06.

Covering 2,040 sq miles, the tract lies 120-150 miles south-southeast of Hong Kong in the Pearl River Mouth basin.

The Japanese group agreed to conduct air gun seismic surveys in the spring of 1986 and begin a drilling program the following autumn.

The Japanese will provide 100% of exploration costs and 49% of development expenses, with the Chinese contributing 51%.

Japex declined to disclose additional details.

The three Japanese companies also are participating with China in Cheng Bei oil field in Bohai Bay. In addition, the Sino-Japanese group is beginning development of another oil strike in Bohai Bay with construction of a platform.

The pact signed by Esso-Shell gives the companies equal partnership in Contract Area 39/11, about 225 miles southwest of Hong Kong.

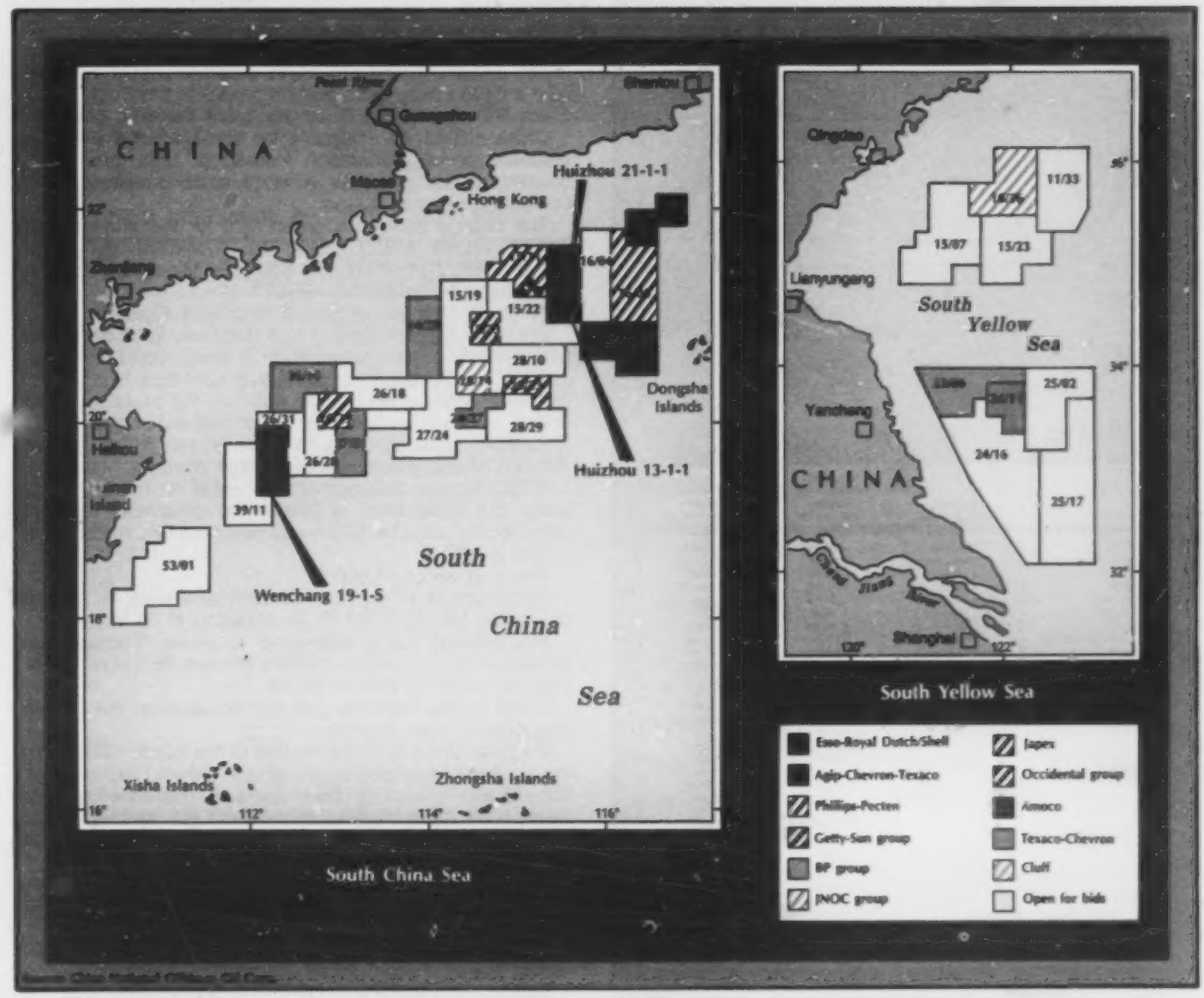
Esso expected to begin seismic surveys early in 1986, with drilling to begin during the last half of the year. Details of the work program are subject to Cnooc agreement.

Exxon Corp., Esso parent, refused to disclose the blocks involved in the 1,496 sq mile contract area.

But some of the blocks apparently are west offsets to Esso-Shell's Contract Area 40/01, which holds the Wenchang 19-1-2 wildcat, a 3,200 b/d oil discovery.

The Esso-Shell team has conducted exploration on Con-

A look at leasing off China



The Xijiang 17-3-1X wildcat, 18 miles northwest of the Xijiang 24-3-1AX discovery, found no hydrocarbons.

Phillips declined to reveal drilling plans.

Phillips operates Block 15/11 and has a 50% interest. Pecten Orient holds the other 50%. Participating in operations are China National Offshore Oil Corp. and Nanhai East Oil Corp.

Hainan Island

Esso China Ltd. and Royal Dutch/Shell unit Shell Exploration (China) Ltd. were drilling the fifth well in Contract Area 40/01 east of Hainan Island.

Location of Wenchang 14-1-1 is in the northeast part of the area.

The first well, Wenchang 19-1-1, formerly 19-1-N, flowed a small volume of oil but was abandoned as noncommercial.

The second well, Wenchang 19-1-2, formerly 19-1-S, flowed 3,200 b/d of 35° gravity oil. Esso said further evaluation is needed to determine commerciality of the well, about 75 miles east of Hainan Island.

Esso-Shell's Wenchang 19-1-3 and 2-1-1 encountered no shows.

Yellow Sea

Exploration continues in China's Yellow Sea, where no commercial oil or gas has turned up yet.

Chevron-Texaco Orient Co. and China National Offshore Oil Corp. spudded the group's third wildcat. Changzhou 24-1-1, about 150 miles north of Shanghai. The well was projected to 13,200 ft.

Cluff Oil (U.K.) Ltd. planned to spud in the Yellow Sea early in 1986.

Norway's Den norske stats oljeselskap (Statoil) has taken a farmout on Cluff Oil group acreage in the Yellow Sea off China.

And in partnership with Cluff and Ste. Nationale Elf Aquitaine, Statoil has submitted a bid for a block in the Pearl River Mouth basin of the South China Sea in China's second round of offshore licensing.

Statoil planned to drill a single well to earn a 50% interest in Cluff's undrilled Contract Area 10/36 covering 1,721 sq miles. Statoil will operate the block in the event of a commercial discovery.

Cluff Oil plc, Cluff Oil (Hong Kong), and Cluff Oil (Pacific) acquired the block in October 1983.

Where China's oil and gas resources are

PETROLEUM

Province*	U.S. state geologic analog	Unit regional production value to 1980 (1980 $/sq km)	Estimated total value (Million 1980 $)
Gansu	Oklahoma	1,800,000	830,000
Qinghai (north)	Oklahoma	1,800,000	1,000,000
Anhui	California	1,800,000	21,000
Beijing	California	1,800,000	2,500
Guangdong	California	1,800,000	32,000
Hainan Dao	California	1,800,000	3,700
Hebei	California	1,800,000	28,000
Nei Monggol (central)	Wyoming	450,000	190,000
Xinjiang (central)	Wyoming	450,000	130,000
Guizhou	Kansas	650,000	130,000
Sichuan (east)	New Mexico	520,000	170,000
Fujian†	Alaska	280,000	9,700
Guangxi†	Alaska	280,000	18,000
Heilongjiang (west)†	Alaska	280,000	6,900
Henan†	Alaska	280,000	13,000
Hunan†	Alaska	280,000	17,000
Nei Monggol (east)†	Alaska	280,000	25,000
Sichuan (west)†	Alaska	280,000	19,000
Yunnan†	Alaska	280,000	32,000
Zhejiang†	Alaska	280,000	8,300
Shanxi	Alabama	160,000	25,000
Hubei	Montana	130,000	24,000
Jilin	Montana	130,000	24,000
Heilongjiang (east)	Arizona	2,800	1,100
Xizang	Arizona	2,800	3,300
Jiangxi	Nevada	980	160
Ningxia	Nevada	980	65
Xinjiang (north)	Nevada	980	340
Xinjiang (south)	Virginia	91	65
Total		20,078,631	5,796,030

NATURAL GAS

Province*	U.S. state geologic analog	Unit regional production value to 1980 (1980 $/sq km)	Estimated total value (Million 1980 $)
Gansu	Oklahoma	1,800,000	830,000
Qinghai (north)	Oklahoma	1,800,000	1,000,000
Guizhou	Kansas	720,000	130,000
Sichuan (east)	New Mexico	650,000	220,000
Nei Monggol (central)†	Wyoming	230,000	200,000
Xinjiang (central)	Wyoming	230,000	130,000
Anhui	California	150,000	21,000
Beijing	California	150,000	2,500
Guangdong	California	150,000	32,000
Hainan Dao	California	150,000	3,700
Hebei	California	150,000	28,000
Qinghai (south)	Colorado	110,000	25,000
Shandong	Colorado	110,000	17,000
Fujian†	Alaska	80,000	9,700
Guangxi†	Alaska	80,000	18,000
Heilongjiang (west)†	Alaska	80,000	6,900
Henan†	Alaska	80,000	13,000
Hunan†	Alaska	80,000	17,000
Nei Monggol (east)†	Alaska	80,000	25,000
Sichuan (west)†	Alaska	80,000	19,000
Yunnan†	Alaska	80,000	32,000
Zhejiang†	Alaska	80,000	8,300
Shanxi	Alabama	53,000	8,200
Hubei	Montana	26,000	4,900
Jilin	Montana	26,000	4,900
Xinjiang (south)	Virginia	10,000	7,200
Heilongjiang (east)	Arizona	280	110
Xizang	Arizona	280	330
Total		7,235,560	2,813,740

*Unit regional production values for provinces not listed are same. Unit regional exploration value in 1980 equals $80/sq km. †Offshore.

Statoil said seismic surveys revealed a number of prospects in relatively shallow water.

Yacheng field activity

Units of Atlantic Richfield Co. and Santa Fe International Corp., along with China National Offshore Oil Co. (Cnooc), plan a $400 million development project in the South China Sea's first commercial discovery, giant Yacheng gas field.

China shifted its emphasis for end use of the gas to electrical power generation instead of urea production, scuttling earlier plans for a world scale grassroots urea complex on Hainan Island.

The change spurred a green light for the project, says ARCO, whose ARCO China Inc. subsidiary signed the development agreement with Santa Fe Minerals (Asia) Inc. and Cnooc in September 1985.

Santa Fe is a unit of Kuwait Petroleum Corp.

Plans call for the Yacheng 13-1 discovery to be developed with a single production platform in about 300 ft of water.

ARCO expected to begin letting contracts in 1985 for definitive engineering design work on the project and for drilling an undetermined number of delineation wells.

Platform construction is to begin in late 1986 or early 1987. It will be a conventional design platform.

ARCO figures development will entail no more than 10 wells, but more work is needed to determine the final development scheme. China estimates the field holds 3.2 tcf of gas in place.

Pay is at about 13,000 ft.

Production is to start in mid-1[illegible] and peak in 1992 at about 350 MMcfd. Field life is projected at 35 years.

ARCO-Santa Fe is scheduled to deliver Yacheng gas through a 65 mile, 30 in. subsea pipeline to Sanya on the southern coast of Hainan Island.

Some of the Yacheng gas will be used on the Hainan Island for a small urea plant.

It's up to China to move the rest of the gas to cities along the southern mainland coast, where growing industrialization will spur increasing power demand. That calls for China to lay a separate pipeline to transport gas across Hainan Island to the mainland, probably with a shore approach on the Leizhou Bandao (Luichow Peninsula).

Yacheng gas will be sold to China Offshore Gas Utilization Corp., a subsidiary of Cnooc, which is responsible for distributing the gas to southern coastal cities.

Gas sale prices will be determined by an undisclosed sliding scale.

Project cost breaks out to ARCO 34%, Santa Fe 15%, and Cnooc 51%, with the same split for revenues after recovery of exploration/development costs.

U.S. technology imports

Chinese and U.S. personnel have drilled China's deepest directional well and expect to surpass the record in 1986.

Crews from Shengli oil field in Shandong Province and Parker Drilling Co. of the U.S. drilled Gubei GB 1-1 to 16,306 ft measured depth with a maximum drift angle of 40.5°. The well was spudded Mar. 5, 1985, and completed Nov. 11.

Wang Guang Qing, deputy director engineer in the Ministry of Petroleum Industry's drilling department, confirmed the well as the deepest directional hole in China.

The well was drilled from an island in the Yellow Sea delta close to many vertical wells.

Shengli and Parker crews drilled the well with a Romanian built rig. Parker provided mud pumps, engines, a choke manifold, and an OIME compound for power distribution.

The two companies planned to spud Gubei GB 1-2 in January 1986 under the same contract between Cnodc and Parker. Projected depth is 18,570 ft. Cnodc was filling in a

Breakout of China's oil production and exports

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
							1,000 b/d						
Production	913.9	1,072.8	1,297.7	1,542.0	1,744.2	1,873.8	2,082.1	2,124.2	2,120.2	2,025.5	2,043.5	2,122.6	2,292.0
Crude exports	12.73	36.70	101.44	197.67	170.01	182.24	226.39	268.78	266.32	275.23	304.24	304.05	433.88
Petroleum product exports	17.81	23.25	29.57	42.04	38.95	39.31	43.51	60.71	84.10	91.88	105.50	102.45	119.25

Source: East-West Center

PRC crude production by field, 1982-1985

Field	1982	1983	1984	1985
	(in million metric tons)			
Major fields:				
Daqing	51.94	52.35	53.56	55.50
Shengli	16.36	18.37	23.01	27.50
Huabei	11.31	10.55	10.20	10.20
Liaohe	5.31	6.11	7.65	8.70
Xinjiang	4.03	4.27	4.57	4.87
Zhongyuan	2.33	3.03	4.00	5.00
Subtotal	**91.28**	**94.68**	**102.99**	**112.27**
Minor fields:				
Nanyang				2.20
Chang Qing				1.40
Yumen				.60
Yenchang				.12
Jianhan				1.00
Sichuan				.10
Jiangsu				.35
Jilin				1.80
Qinghai				.10
Da Gong				3.20
Subtotal	**10.84**	**11.39**	**11.54**	**12.43***
Total	**102.12**	**106.07**	**114.53**	**124.70**

*Total does not add due to rounding and some very minor fields.
Source: Charlie Kirkwood, consultant, Shawnee-on-Delaware, Pa.

RC projected production, 1990

Field	PRC presumed plan*	Source's estimate	PRC best case
	(in metric tons)		
Daqing	55.0	53.0	55.0
Shengli	50.0	48.0	50.0
Huabei	10.0	9.2	10.0
Liaohe	14.0	12.8	16.0
Xinjiang	6.0	6.0	8.0
Zhongyuan	10.0	10.0	12.0
Major fields	**145.0**	**139.0**	**151.0**
Field			
Nanyang	2.2	2.13	2.2
Chang Ding	1.4	1.4	1.4
Yumen	.6	.6	.6
Yenchang	.12	.12	.12
Jianhan	1.0	1.0	1.0
Sichuan	.1	.1	.1
Jiangsu	.35	.35	.5
Jilin	1.8	1.8	1.8
Qinghai	.1	.1	.1
Dagong	3.2	2.4	3.2
Minor fields	**10.87**	**10.0**	**11.02**
Offshore		1.0	2.0
Total	**155.33**	**150.0**	**164.02**

*The Chinese have not yet broken down their 150 million ton 1990 target by fields. The figures listed in this column are a result of discussions with various MOPI officers. Since the figures came from various uncoordinated sources they do not add up to precisely 150 million tons.

Source: Charlie Kirkwood, consultant, Shawnee-on-Delaware, Pa.

drilling pad near the Yellow River delta, and the well will be directionally drilled under Bohai Bay.

Parker in 1980 became the first U.S. land drilling contractor awarded a contract in China and in 1985 opened a division office in Beijing.

In addition, China's Ministry of Geology and Mineral Resources let contract to Loffland Bros. North Sea Inc. for drilling services in Sichuan Province.

The subsidiary of Loffland Bros. Co., Tulsa, will operate a rig purchased by the Chinese to drill the 100 Chuan He wildcat to 18,500 ft. Drillsite is 50 miles northeast of Chengdu, Sichuan's capital city.

The contract also calls for Loffland to train Chinese personnel participating in operation of the rig to conduct efficient drilling operations.

Spud date depended on status of preparedness of the rig.

The 2,000 hp rig is rated to 20,000 ft. Equipment includes a Gardner Denver 1500 drawworks, 142 ft Superior mast with 1 million lb hookload capacity, Caterpillar D-399 engines, two PZ-10 mud pumps, a Baylor five bridge SCR system with GE 752 generators and motors, a 27½ in. rotary table independently driven by one motor, and a 25 ft box on box substructure.

Most Loffland personnel for the project, including the project manager and engineer, were trained in the company's North Sea organization.

The contract is Loffland's first with China, the 38th country in which the company has drilled since starting international operations in 1943, said Loffland Pres. W.E. Schultz.

China also has ordered a 50,000 kw combined cycle plant from General Electric Co. to provide power for an expanded waterflood program in giant Daqing oil field.

The $13.9 million order covers equipment, spare parts, and technical advisers for the power project. Two phase installation is scheduled to see an MS6001 gas turbine in operation by October 1986, with the combined cycle plant due for start-up by August 1987.

Daqing, a complex of fields in Heilongjiang Province, accounts for about 45% of China's 2.474 million b/d production.

Installation site for a GE single shaft STAG 106 combined cycle plant will be next to a cogeneration plant for which the company agreed to supply a similar gas turbine.

Equipment for the STAG plant will include a steam turbine, 60 MVA generator, heat recovery steam generator, GE Speedtronic Mark IV gas turbine control system, and a GE Datatronic information and control system.

China National Technical Import Corp. placed the order on behalf of the Daqing Petroleum Administration of the

Ministry of Petroleum Industry.

STAG technology combines steam and gas turbines into a single power generating system. Waste heat from a gas turbine feeds into a heat recovery steam generator to produce steam to run the steam turbine and produce more power.

China revealed no details on the new project to expand Daqing's waterflood program that began in 1960.

In September 1982 Xinhua News Agency reported that waterflooding had added 20,000-30,000 b/d to Daqing production.

"To date," Xinhua said, "11 of the production blocks put into operation earlier have produced more than 25% of original oil in place. Of these, five blocks have produced more than 30% of original oil in place."

At that time, Daqing's "successful experience" had been introduced to other large Chinese oil fields such as Shengli, Jizhong, Liaohe, Dagang, and Karamay.

The country also has ordered more seismic data gathering equipment from the U.S.

Oil and gas offshore, year-end 1984

	Oil (million metric tons)		Gas (billion metric meters)	
	Proved	Probable	Proved	Probable
Bohai (Liaodong Bay)	0	100	0	20
Bohai (center and south)	25	275	5	45
Korea Bay	0	5	0	6
Yellow Sea	10	1,490	10	90
Okinawa Trough	0	100	0	60
Southwest Taiwan basin	0	140	1	85
Zhujiangkou basin (Pearl River basin)	30	270	10	90
Yinggehai (Southeast of Hainan Island) basin	3	27*	90	310
Yinggehai (west of Hainan Island) basin	0	70	0	100
Beibuwan basin	25	115	10	90
Totals	**93**	**2,592**	**126**	**902**

*This figure excludes more than 1 billion metric tons of in-place heavy oil in the ARCO discovery (gas) south of Hainan Island. The gas (proved) is 90 billion cubic meters, according to ARCO. (Published in Wall Street Journal).

Source: Official figures published in Oil and Gas Geology (in Chinese), 1985, Vol. 6, No. 3, p. 8.

Applied Automation Inc., Bartlesville, Okla., a unit of Phillips Petroleum Co., shipped the seventh Opseis system that the Chinese have purchased in 2 years.

The system includes 65 portable terminals that collect seismic data through geophones and a central doghouse in which data are recorded onto magnetic tape for further analysis.

Most of the Opseis systems in China are being used to explore for oil and natural gas along the coast of the Yellow Sea in the northeast part of the country.

Teams of Applied Automation scientists and technicians have made three trips to China to train Chinese technicians to operate the Opseis equipment.

Another delegation from China was to visit Bartlesville in 1985, says Lee Demartino, vice-president and general manager of the geophysical systems division.

China began taking delivery of 2,180 pump barrels for use in Shengli field.

Half the units, made by Lone Star Steel Co. and sold by Crow International Group Inc., Dallas, are made of SAE 7140 ERW/DOM steel. It is the first commercial use of a hard abrasion resistant steel in a pump barrel, says Crow, which also is handling two similar deals with the Chinese.

The remaining units are made of SAE 7140 Nitroloy G steel.

Delivery was to be completed by year-end 1985.

Crow also released purchase orders for six vertical, 600 hp waterflood pumps for use in Daqing field.

China Oil & Gas Exploration & Development Corp. signed a 5 year contract with Dyna-Drill covering equipment, parts, and training for the manufacture, operation, and maintenance of downhole mud motors.

The U.S. firm will provide technical advisers for layout, construction, equipping, and staffing of three manufacturing plants in Beijing and Dagang oil field. Dagang field lies about 110 miles southeast of Beijing on the western shore of the Bohai Sea.

The U.S. company also will provide 12,960 hr of training—9,600 hr in Irvine and the remainder in China.

Dyna-Drill is the second division of Smith International to engage in a venture with China. In 1983, its McEvoy division in Houston agreed to provide technical training in the manufacture of wellheads and christmas tree for offshore installation.

Five land rigs were exported to China from Oklahoma during 1985, and the Chinese expected to purchase many more U.S. rigs.

Three heavy rigs and two truck mounted rigs were shipped to Houston in about 250 truckloads, then loaded aboard the Greek flag vessel MV Thalassini Kyra, expected to reach the Chinese port of Xingang, south of Beijing, in mid-June.

Far East Equipment Corp., Oklahoma City, refurbished the rigs and has a contract to operate them in Shengli oil field, Shandong Province, for 6 months.

Myers Maritime Lines (Charter Division), Houston, a subsidiary of Myers Group, arranged the transportation. The operation was monitored by Chinese government officials represented in the U.S. by China National Machine Import & Export Corp.

Three of the rigs are used Continental Emsco C-2 SCR diesel/electric units rated to 25,000 ft. The other two are unused truck mounted Crane Carrier Corsair 500s rated to 10,500 ft.

Price tags are $10 million for the rigs and more than $1 million for the transportation. The rigs originated with Westwood Drilling Co., Woodward, Okla., sources said.

Processing industry

China expects a growth spurt in its oil and petrochemical industries the next 6 years.

The country will invest more in development during the next half dozen years than in the following 30, said Zhang Wanxin, executive vice-president of China Petro-Chemical International Corp. (Sinopec).

Zhang made the statement in Houston in 1985, where he signed an agreement with M.W. Kellogg Co. to form a joint venture engineering/construction firm to operate in China and other countries.

The joint venture will provide engineering, procurement, construction, and construction management for and transfer technology to the refining, petrochemical, chemical, and energy processing industries.

Sinopec, with a staff of 480,000 persons, is a ministerial level economic entity established in July 1983 and directly

Onshore gas in China

Region	Produced 1-1-70 to 12-31-84	Recoverable reserves 12-31-80 — Associated	Nonassociated	Total	Recoverable reserves 12-31-84 — Associated	Nonassociated	Total	Speculative or undiscovered resources
China total	158.2	58	73.5	131.5	164[2]	101	265	490
Northeast	21	25	0	25	48	1	50	25
North	11	5	0	5	20	0	20	20
East	19	10	3.5	13.5	60	10	70	75
Central-South	—	2.5	0	2.5	10	0	10	20
Northwest	2.8	15	0	15	25	50	75	150
Southwest	104.41	0.5	70	70.5	1	39	40	200

under control of the state council.

The new company will have equal Kellogg and Sinopec representation on the board. Both sides will have equal investment and will share in profit and loss. The joint venture is to operate for at least 15 years.

Kellogg since 1973 has designed and engineered 20 worldscale petrochemical plants in China. It opened a Beijing office in 1975.

The joint venture agreement is the fourth signed by Kellogg with the Chinese in 1985.

Two of the other agreements are with China National Technical Import Corp. and call for an organization to design, plan, and build expatriate communities in China, and for a consultancy to aid foreign companies who wish to enter into or buy from the China market.

The third, a joint venture with First Heavy Machinery Works of the Ministry of Machine Building Industry, will provide proprietary coal gasification technology to China.

Kellogg also is working with Chinese agencies and industry to modernize several ammonia fertilizer plants and at least one ethylene plant. Kellogg has other studies under way on further development and modernization of China's refining, petrochemical, and gas processing industries.

Other activity

China National Technical Import also let contract to Fluor China Services Inc. for a 70.63 MMcfd natural gas processing plant to be built in China's Liaoning Province.

Fluor will provide engineering, procurement, construction services, and staff training for the plant, which will process associated gas from Liao He oil field.

China Petro-Chemical International Co. let contract to Stone & Webster Engineering Corp. for upgrades of two refineries.

Stone & Webster will install proprietary fluid catalytic cracking units at a 20,000 b/d refinery in Wahan, Hubei Province, and a 28,000 b/d refinery in Zhenhai, Zhejiang Province.

The units at the two refineries will handle gas oil and vacuum tower bottoms.

The Zhenhai refinery, where work will be complete in 1988, processes crude from Shengli field. The Wahan refinery, where work will be complete in 1987, processes crude from Zhenhai field.

China Petro-Chemical also let contract to UOP Inc., Des Plaines, Ill., for expansion of its Nanjing linear alkylbenzene (LAB) complex.

Operated by Sinopec subsidiary Jin-Ling Petrochemical Co., the plant is to boost capacity to 72,000 metric tons/year of LAB from the current 50,000 metric tons. In addition, the plant will produce 17,600 tons/year of heavy normal paraffins.

UOP will provide engineering design for the expansion.

It also will supply its new DeH-7 dehydrogenation catalyst, said by UOP to have greater activity that minimizes plant changes required to boost unit capacity.

Jin-Ling's Nanjing complex includes hydrotreating, Molex process, Pacol process, and detergent alkylation units, all designed by UOP and started up in 1980.

LAB feedstocks are kerosine and benzene.

New refinery

China plans to build a 60,000 b/d refinery as part of a $450 million industrial development project on the Nantou Peninsula near Shenzhen.

Mutual Oil of America Inc., Reno, Nev., agreed to assist the project, designed to support exploration/development in the South China Sea.

Mutual will arrange debt financing and receive a share of profits for 25 years.

Profits then will revert to China's Nanhai Oil Shenzhen Development Service Corp.

The project includes harbor facilities, a 29 mile rail line, and an information center.

Atlantic Richfield Co. won't become an equity partner in downstream operations involving natural gas production from its giant South China Sea discoveries.

That's the word from Robert W. Page, chairman of Kellogg Rust Inc. ARCO China Inc., a subsidiary of ARCO International Oil & Gas Co., in 1984 gauged 64 MMcfd of gas on three tests of a delineation to its discovery well about 65 miles south of Hainan Island.

ARCO recommended first phase development of the reserves—estimated at several trillion cubic feet—involve a world class ammonia/urea manufacturing complex on nearby Hainan Island. ARCO had proposed that it become an equity partner in a transportation system from its discovery to Hainan Island, a fertilizer complex on the island, and an ammonia/urea marketing operation.

But Page, whose company has done South China Sea gas market feasibility studies for ARCO and Cnooc, said ARCO and Cnooc have agreed to withdraw the equity proposal. In addition to a world class ammonia/urea complex, Kellogg Pres. Donald C. Vaughn said first phase development of South China Sea gas reserves most likely will involve a gas fired electric power generating plant on Hainan Island and gas trunklines to Hong Kong and mainland China.

In early part of 1986, China began operating an aromatics facility at Shanghai Petrochemical Co.'s Shanghai works.

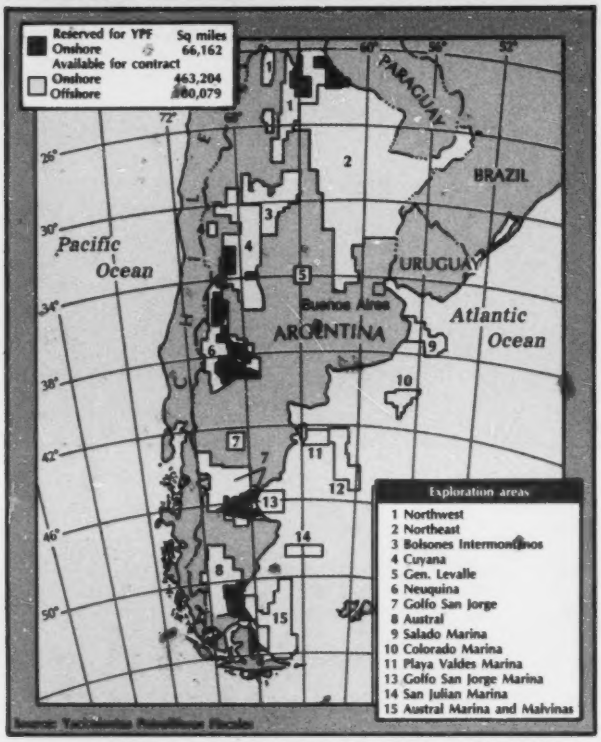
The UOP Inc.-designed complex can produce more than 85,000 metric tons/year of benzene as well as 180,000 metric tons/year of paraxylene.

The facility has a naphtha hydrotreater, a UOP Platformer with continuous catalyst regeneration, a Shell Sulfolane unit for aromatics extraction, a UOP Parex unit for recovery of high-purity paraxylene, a UOP Isomar unit to isomerize xylenes to paraxylene, and a UOP Tatoray unit for the disproportionation of toluene and heavy aromatics into benzene and xylenes.

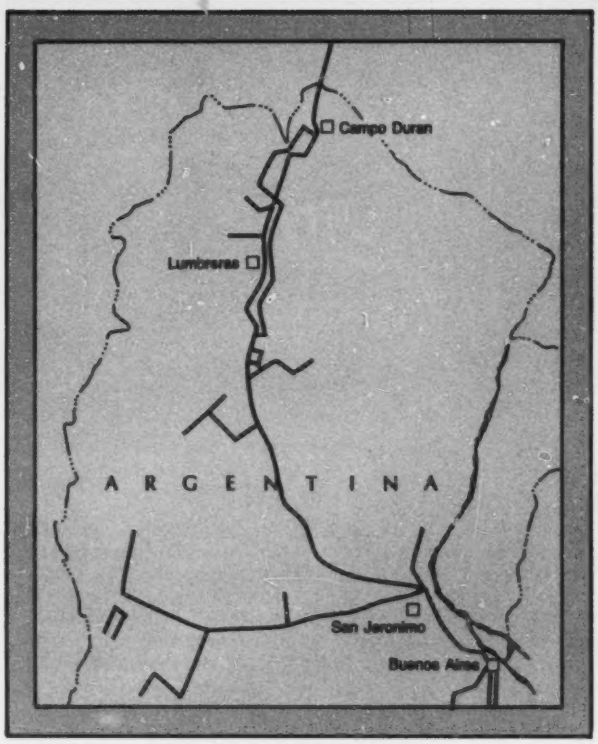
UOP's Parex technology is a liquid phase continuous countercurrent adsorptive separation process that uses the company's Sorbex separations technology.

BEST AVAILABLE COPY

Where blocks are open in Argentina



Northern system



are to be paid in local and foreign currency, with the split set by contract. YPF may choose to pay contractors the foreign currency component in crude oil or refined products.

Gas discoveries

In the event of a commercial gas discovery, the government and contractors have more flexibility on a timetable for development and production.

To win a commercial designation, contractors will be required to commit to invest in developing a transportation system, reinjection facilities, and industrialization projects in the country. Flaring will not be allowed.

Compensation for natural gas is to be paid in local currency based on either a percentage—perhaps 10%—of the international price for crude or a negotiated price based on local market conditions. Operators say the price isn't high enough to justify gas development.

But the government left open the possibility of partial payment in foreign currency when gas is destined for export and will generate foreign currency income for the government.

Hidra field development

The government and a combine led by a unit of France's Total group reached in 1985 what appeared to be a precedent setting agreement paving the way for development of Hidra oil field off Tierra del Fuego.

Development had been stalled because YPF and Hidra partners couldn't agree on how the companies would be paid for crude. Under the agreement, the Total group is to be paid 35% in local currency and 65% either in U.S. dollars or products refined locally that are exportable.

The choice is left to the operator.

It is believed to be the first time the government has allowed exports and agreed to that payment split. The government previously had resisted allowing exports or paying for too much crude in scarce U.S. dollars.

Hidra will be the second field slated for development off Argentina. Total has drilled 23 wells there, with 19 successful.

In 1984, YPF and Shell Cia. Argentina de Petroleo SA agreed on terms for a $290 million development of Shell's nearby discoveries. But because neither YPF nor Shell revealed details of the agreement, it is not known whether Total won the same or different—and better—terms.

Hidra's $300 million development project calls for two platforms to be installed, each with nine wells; five producers and four water injectors. Production is expected to be 25,000 b/d at first.

Production will move ashore by pipeline for treatment. Start-up is possible by year-end 1987. Total estimates reserves at 55 million bbl.

Northern gas pipeline system

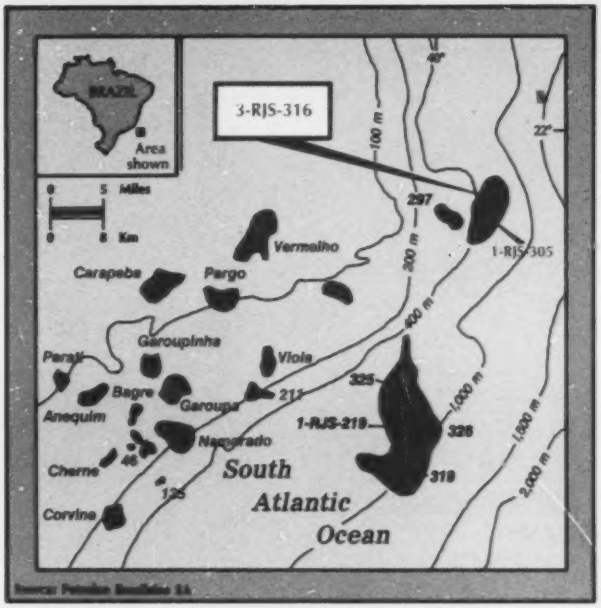
Argentina will embark on a $200 million project to boost capacity of the northern gas pipeline system.

Inter-American Development Bank (IADB), a World Bank affiliate, will lend about $60.3 million for the project. The Argentine government will provide the rest. Gas del Estado, a public corporation, will carry out this second stage of expansion of the pipeline between Campo Duran and Buenos Aires. Capacity will rise to 476.55 MMcfd from 300.05 MMcfd.

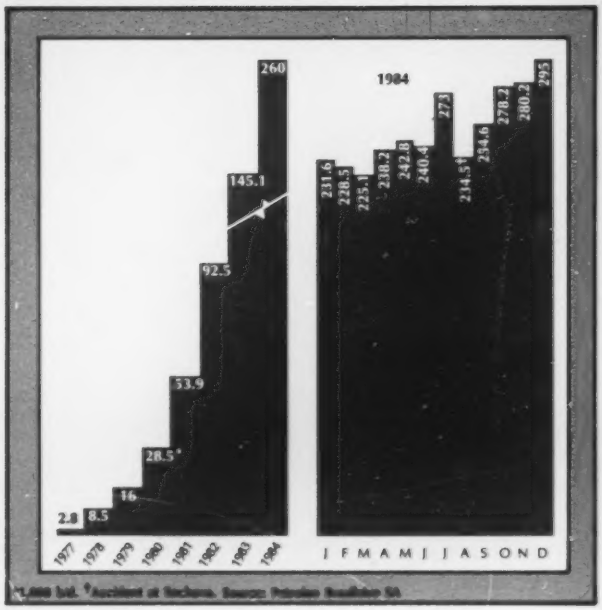
The 1,081 mile, 24 in. line originates at the Bolivian border.

The system carries a mix of gas from Campo Duran field

Where Petrobras confirmed a big strike



Campos production



and gas imported from Bolivia. When expansion is complete the pipeline will be able to carry more gas from Campo Duran field, which is being developed by the government with the help of World Bank.

The gas is earmarked to meet growing demand in northern Argentina.

As part of the pipeline project, compressor stations at Lumbreras in Salta Province, Lavalle in Santiago del Estero Province, and San Jeronimo in Sante Fe Province will be expanded, and three more compressor stations will be built along the system.

In addition, loops will be laid, some pipeline sections will be replaced, and a telemetry system will be incorporated into the line. IADB has made seven loans to help expand Argentina's gas pipeline system.

Argentina, Brazil collaborate

Argentina and Brazil were studying a major natural gas supply project to move Argentine gas to Sao Paulo via a 932 mile pipeline.

Officials of the countries detailed the project during a ministerial meeting of the Latin American Organization of Energy in 1985.

The project calls for transporting about 706-882 MMcfd from northern Argentina's Salta Province through Paraguay to Sao Paulo in southern Brazil. Argentina is to finance construction of the line.

A fertilizer plant also is to be built in the border region between the two countries near Foz Do Igua U in Parana state, Brazil.

A joint company made up of YPF and its gas supply distribution company Gas Del Estado, Brazil's Petroleos Brasileiro SA, and private companies from both countries is to oversee the project.

Petrobras officials agree with the Argentine proposal but wanted to review it further before making a commitment.

Brazil produces about 480 MMcfd of gas from reserves estimated at 2.84 tcf. The country is mapping a natural gas development program.

Argentina's natural gas reserves are estimated at 24.6 tcf.

BRAZIL

CAPITAL: Brasilia
MONETARY UNIT: Cruzeiro
REFINING CAPACITY: 1,305,100 b/cd
PRODUCTION: 540.5 M b/d
RESERVES: 2,070,000 M bbl

BRAZIL'S PETROLEO BRASILEIRO SA CONFIRMED A giant deepwater oil discovery in 1985 in the offshore Campos basin.

The 3-RJS-316 confirmation flowed 2,470 b/d through a ½ in. choke from pay at 8,676-11,923 ft.

Drillsite, in 2,188 ft of water, was on what appeared to be a 62 sq mile structure in the northeast part of the basin, Petrobras said.

The well confirmed Petrobras' 1-RJS-305 discovery that flowed 2,200 b/d through a ½ in. choke from 8,567-87 ft and 2,898 b/d of oil through a ½ in. choke from 8,453-8,512 ft. The strike, 65 miles off Cabo de San Tome in 1,433 ft of water, was tested late in 1984.

Petrobras believes each well could produce 10,000 b/d.

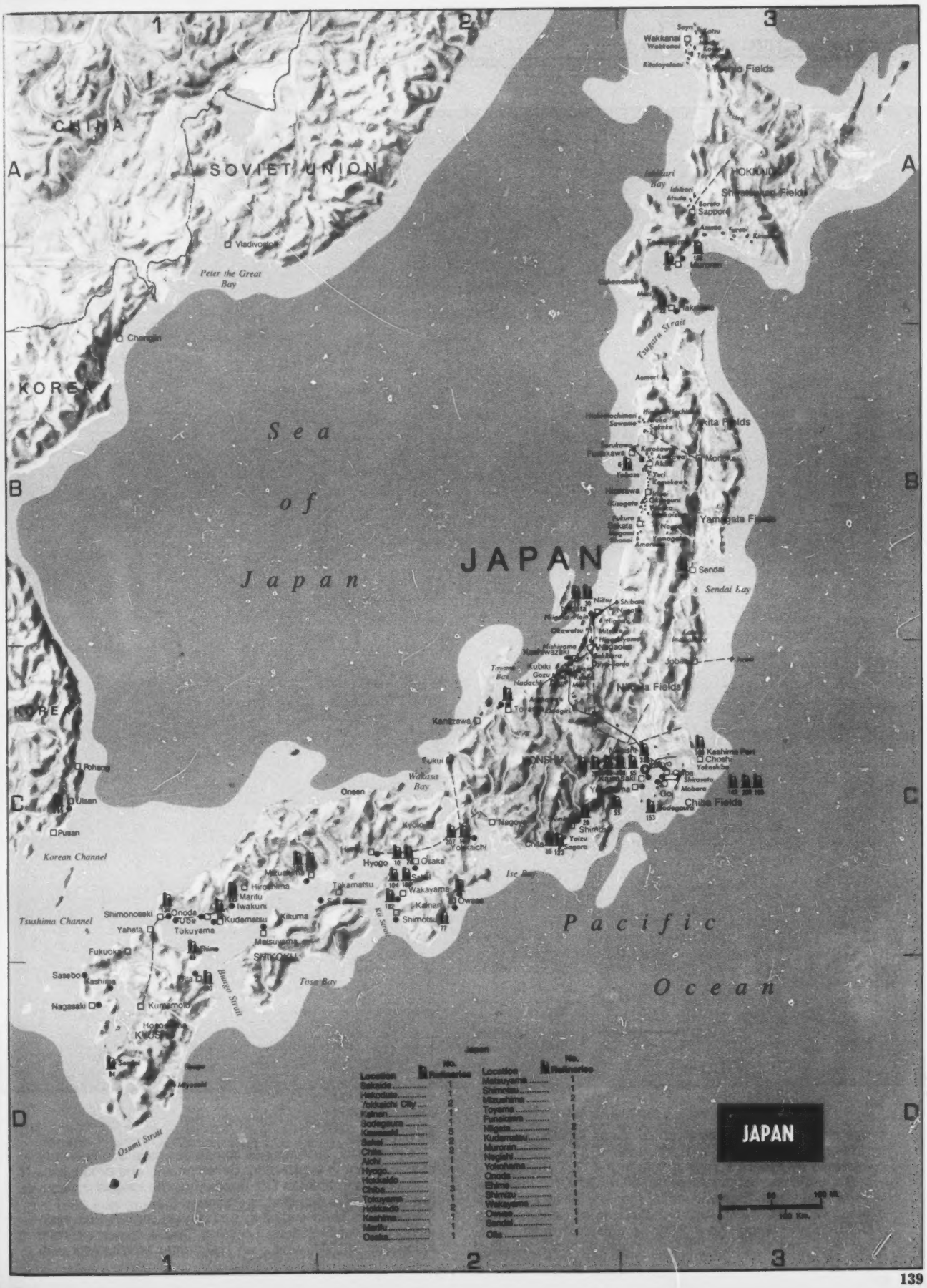
Wagner Freire, Petrobras vice-president for exploration, said if an early production system were used, the field could be on stream in 2-3 years.

Data acquired so far indicate a reservoir of more than 1 billion bbl of oil in place, Petrobras said. Probable reserves are estimated at about 300 million bbl, of which 30-40% is recoverable.

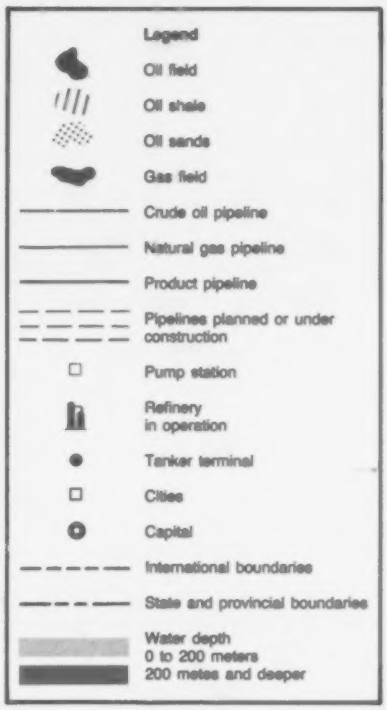
Namorado, at present the largest oil field in the Campos basin, may contain as much as 265 million bbl of recoverable reserves.

Brazil depends heavily on production from the basin, which provides more than half of the country's oil.

Petrobras expected Campos production to rise to 355,000 b/d by late 1985, averaging 332,000 b/d during 1985. Production will increase further in December 1987 and first quarter 1988 after six more platforms are placed on production.


CHINA
SOVIET UNION
KOREA
Sea of Japan
JAPAN
Pacific Ocean
Peter the Great Bay
Vladivostok
Changjin
Tsugaru Strait
HOKKAIDO
Ishikari Bay
Sapporo
Shiranuka Fields
Muroran
Akita Fields
Mori Fields
Yamagata Fields
Sendai
Sendai Bay
Niigata Fields
Kanazawa
Fukui
Wakasa Bay
Onsen
Kyoto
Osaka
Nagoya
Ise Bay
Yokkaichi
Yokohama
Tokyo
Kashima Port
Choshi
Yokoshiba
Chiba Fields
Goi
Sodegaura
Shimizu
Yaizu
Omaezaki
Hyogo
Takamatsu
Wakayama
Kainan
Owase
Shimotsu
Mizushima
Hiroshima
Marifu
Iwakuni
Kikuma
Matsuyama
Shikoku
Tosa Bay
Bungo Strait
Tsushima Channel
Korean Channel
Shimonoseki
Onoda
Ube
Tokuyama
Yahata
Kudamatsu
Fukuoka
Sasebo
Kashima
Nagasaki
Kumamoto
Kyushu
Oita
Miyazaki
Osumi Strait
Pohang
Ulsan
Pusan
Ku Strait
Seya
Wakkanai
Kitahoyotsumi
Ishikari Atsuta
Aomori
Hachinohe
Sawame
Fukukawa
Yokaze
Hamawaki
Kisogoto
Fukura
Sakata
Akita
Amori
Niitsu
Shibata
Niigata
Nishiyama
Kashiwazaki
Kubiki
Gozu
Nadachi
Toyama
Toyama Bay
Tateyama
Kurobe
Nagaoka
Joetsu
Jobashi
Kashima
Kisarazu
Mobara
Kujukuri
Ichihara
Anegasaki
Ohgishima
Kawasaki
Yokosuka
Shimizu
Yaizu
Omaezaki
Nagoya
Yokkaichi
Osaka
Sakai
Wakayama
Kainan
Owase
Shimotsu
Hyogo
Mizushima
Takamatsu
Hiroshima
Marifu
Iwakuni
Kikuma
Matsuyama
Onoda
Ube
Tokuyama
Yahata
Kudamatsu
Fukuoka
Sasebo
Kashima
Nagasaki
Kumamoto
Oita
Miyazaki
Shimonoseki
Pohang
Ulsan
Pusan
Japan
Location
No. Refineries
Sakaide 1
Hokodate 1
Yokkaichi City 2
Kainan 1
Sodegaura 1
Kawasaki 5
Sakai 2
Chita 2
Aichi 1
Hyogo 1
Hokkaido 1
Chiba 3
Tokuyama 1
Hokkaido 2
Kashima 1
Marifu 1
Osaka 1
Location
No. Refineries
Matsuyama 1
Shimotsu 1
Mizushima 2
Toyama 1
Funakawa 1
Niigata 3
Kudamatsu 1
Muroran 1
Negishi 1
Yokohama 1
Onoda 1
Ehime 1
Shimizu 1
Wakayama 1
Owase 1
Sendai 1
Oita 1
JAPAN
0 50 100 Mi.
0 100 Km.

1
2
3
A
B
C
D
NORWAY
SWEDEN
SCOTLAND
N. IRELAND
UNITED KINGDOM
North Sea
DENMARK
IRELAND
Dublin
Whitegate
Bantry Bay
WALES
ENGLAND
Milford Haven
Liverpool
Manchester
Birmingham
Bracton
London
Thames
Severn
Wash
NETHERLANDS
Amsterdam
Rotterdam
Groningen
Bremen
Hamburg
Rostock
Stettin
GERMAN DEMOCRATIC REPUBLIC
FEDERAL REPUBLIC
Berlin
Dresden
Leipzig
Bonn
Cologne
Dusseldorf
Dortmund
Hannover
Frankfurt-am-Main
Karlsruhe
Stuttgart
Munich
Ingolstadt
Linz
Prague
Zurich
Geneva
Basel
Bern
Lucerne
Milan
Turin
Genoa
Ravenna
Rome
Naples
Palermo
Catania
Messina
Reggio
Taranto
Bari
Brindisi
Foggia
Pescara
Ancona
Rimini
Venice
Trieste
Graz
Klagenfurt
Innsbruck
Salzburg
Passau
Regensburg
Nuremberg
Wurzburg
Mannheim
Karlsruhe
Baden-Wurttemberg
Metz
Nancy
Strasbourg
Mulhouse
Colmar
Belfort
Besancon
Dijon
Lyon
Grenoble
Chambery
Turin
Nice
Monaco
Marseille
Toulon
Avignon
Montpellier
Nimes
Arles
Aix-en-Provence
Gap
Briancon
Digne
Cannes
Antibes
Menton
Ventimiglia
Imperia
Savona
Genoa
Alessandria
Novara
Como
Bergamo
Brescia
Verona
Mantua
Modena
Parma
Reggio
Bologna
Ferrara
Rovigo
Padua
Vicenza
Udine
Gorizia
Trieste
Pola
Fiume
Zagreb
Ljubljana
Maribor
Villach
Klagenfurt
Graz
Leoben
Linz
Passau
Ingolstadt
Munich
Augsburg
Ulm
Stuttgart
Heilbronn
Wurzburg
Nuremberg
Bayreuth
Hof
Chemnitz
Dresden
Leipzig
Halle
Magdeburg
Brunswick
Hannover
Bremen
Hamburg
Lubeck
Rostock
Stettin
Berlin
Potsdam
Frankfurt
Mainz
Koblenz
Trier
Saarbrucken
Kaiserslautern
Mannheim
Heidelberg
Darmstadt
Wiesbaden
Cologne
Bonn
Aachen
Dusseldorf
Essen
Dortmund
Bielefeld
Kassel
Gottingen
Hildesheim
Brunswick
Magdeburg
Halle
Leipzig
Dresden
Chemnitz
Zwickau
Plauen
Hof
Bayreuth
Nuremberg
Regensburg
Passau
Linz
Salzburg
Innsbruck
Bregenz
Zurich
Basel
Geneva
Lausanne



only oil field.

The renegotiation of the Prinos concession came after the government declared a drilling ban, which the oil companies complained was designed to force negotiations.

Under the pact, Greece will hold at least a 10% interest in new wells near the field and a 25% interest in wells in the surrounding area.

The government said the pact will facilitate exploration in the Agean Sea west of Thassos Island.

Prinos is operated by North Agean Petroleum Co., which is owned by Dennison Mines Ltd., Wintershall AG, Fluor Corp., and Basix Corp.

Refining operations

Due to declining worldwide demand for lead antiknock additives, Ethyl Corp. closed its Thessaloniki plant producing the lead compounds and related chemicals.

It plans eventually to liquidate the subsidiary which operates the plant, Ethyl Hellas Chemical Co.

Greece's Motor Oil (Hellas) Corinth Refineries SA was completing work on a 3,500 b/d isomerization unit and a 3,400 ton/year MTBE unit at its 100,000 b/d Aghii Theodori refinery.

North Agean Petroleum let contract for two 6,000 kw gas turbine waste heat boilers. The units, to be installed near Kavala, will supply electrical power to a refinery and to an offshore production platform.

Hellenic Aspropyrgos Refinery SA is upgrading its 110,000 b/d Athens refinery with installation of continuous regeneration catalytic reforming, vacuum gas oil hydrocracking, and dimerization units.

IRELAND

CAPITAL: Dublin
MONETARY UNIT: Irish Pound
REFINING CAPACITY: 56,000 b/d
PRODUCTION: 0
RESERVES: 0

IN AN EFFORT TO ENCOURAGE exploration, Ireland has reduced royalties and state participation in small offshore discoveries.

The government drafted a complex formula to define a marginal field. Such fields will receive royalty relief on the first 25 million bbl of production from reserves of less than 75 million bbl, and state participation less than the current 50% maximum.

The relaxed terms were announced to increase interest in the country's third licensing round. In that round, more than 70 blocks were offered and 15 offshore concessions were awarded.

Irish officials said they would consider expanding the system to discoveries made on existing leases. They said the plan is more generous to operators than the exploration terms offered by any other European nation.

Operators drilled a half dozen wildcats off southern Ireland in 1985, but only one found what might prove to be commercial production.

BP Petroleum Development Ltd. drilled a wildcat in Block 48/18 which flowed 13.7 MMcfd of gas through a 1 in. choke from the Cretaceous in the 4,400 ft range.

The hole was 13 miles offshore in 295 ft of water. Unofficial estimates were that the field has 500 billion cu ft, which could make it Ireland's second commerical offshore field.

Gulf Oil Ireland had an oil discovery on Block 50/6, about 30 miles south of Waterford.

Details weren't disclosed, but the Gulf discovery was not believed to be commercial. However, it did show that oil finds are possible in the Celtic Sea, where previously only Marathon's Kinsale gas field had been put on production.

Plans for a gas pipeline through the Irish Republic to Northern Ireland have been abandoned.

Great Britain had considered funding the $84 million line, but rejected it due to decreasing natural gas de-

International seismic crew count

	1980			1981			1982		
	Land	Marine	Total	Land	Marine	Total	Land	Marine	Total
	(Average crews operating)								
United States	502	38	540	644	45	689	512	57	569
Canada	75	3	78	66	5	71	63	5	68
Mexico	29	3	32	29	3	32	29	1	30
Central & South America	66	7	73	91	8	99	98	7	105
Europe	60	23	83	66	29	95	69	31	100
Middle East	40	4	44	45	4	49	43	3	46
Africa	64	7	71	82	7	89	70	6	76
Far East	59	20	79	79	13	92	103	16	119
Total	**895**	**105**	**1,000**	**1,102**	**114**	**1,216**	**987**	**126**	**1,113**

	1983			1984			1985		
	Land	Marine	Total	Land	Marine	Total	Land	Marine	Total
	(Average crews operating)								
United States	430	49	479	441	47	488	332	48	380
Canada	72	7	79	82	5	87	110	4	114
Mexico	28	1	29	32	0	32	32	0	32
Central & South America	81	5	86	79	9	88	73	9	82
Europe	71	26	97	81	35	116	74	30	104
Middle East	33	1	34	36	2	38	43	3	46
Africa	60	10	70	53	6	59	48	6	54
Far East	95	15	110	85	12	97	98	8	106
Total	**870**	**114**	**984**	**889**	**116**	**1,005**	**810**	**108**	**918**

*First half.
Source: Society of Exploration Geophysicists

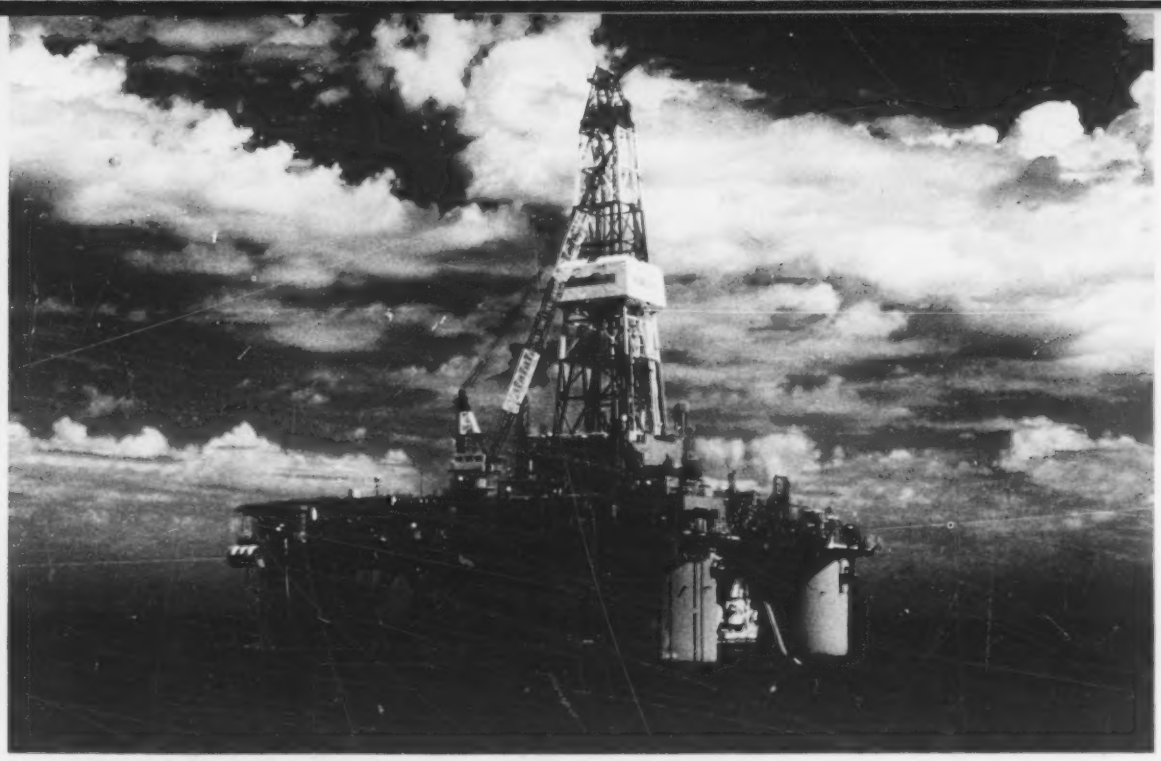
correlate, before or after stack. Operators have the option of collecting raw data or compacting the data as required for the prospect.

Seiscom Delta United also reported success in 1985 with a telemetry unit, the Seismic Group Recording (SGR) system. Seiscom conducted a large 3-D land survey in a densely populated part of East Texas with a crew of more than 40 people recording a total of 680,000 traces. The project required a little more than 4 months and would not have been possible without SGR.

Writing in the Oil & Gas Journal, Seiscom and Conoco Inc. listed three advantages of SGR over conventional recording systems.

"Each SGR recorder is completely self contained with its own cassette tape recorder and battery power that is good for as long as 6 days. There are no cables. In this densely populated area with buildings everywhere, farm ponds, and a railroad that ran through every swath, laying cables would have been a nightmare. Even had the land been perfectly flat and devoid of obstruction, shooting a single spread by conventional means would have required a minimum of 25 miles of cable.

"The lack of cable...improved the quality of the data. There was no cable to...pick up noise and transmit it to an



SEMISUBMERSIBLE drills ahead in deep water.

International Active Rig Count

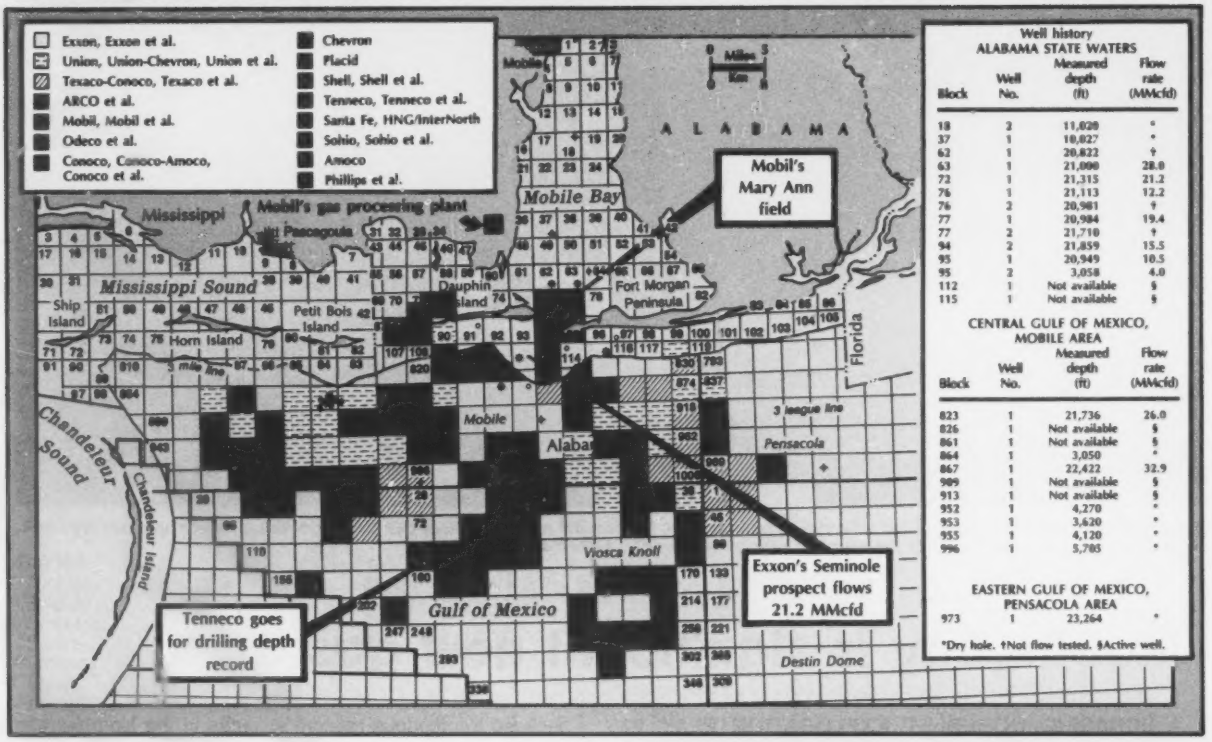
Region	1978	1979	1980	1981	1982	1983 Land	1983 Off.	1983 Total	1984 Land	1984 Off.	1984 Total	1985 Land	1985 Off.	1985 Total
NORTH AMERICA														
Canada	272	339	401	264	199	190	11	201	245	14	259	302	9	311
United States	2,255	2,176	2,910	3,969	3,117	1,972	257	2,229	2,158	271	2,429	1,722	254	1,976
Subtotal	**2,527**	**2,515**	**3,311**	**4,233**	**3,316**	**2,162**	**268**	**2,430**	**2,403**	**285**	**2,688**	**2,024**	**263**	**2,287**
LATIN AMERICA														
Argentina	72	63	76	70	67	73	0	73	82	0	82	81	0	81
Barbados	0	0	0	1	1	1	0	1	1	0	1	1	0	1
Bolovia	6	6	4	11	11	8	0	8	6	0	6	5	0	5
Brazil	52	60	72	81	94	54	29	83	44	26	70	46	30	76
Chile	5	6	7	7	7	3	3	6	3	3	6	3	3	6
Colombia	11	15	14	22	23	18	0	18	16	0	16	21	0	21
Costa Rica	0	0	0	0	0	1	0	1	1	0	1	0	0	0
Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecuador	1	3	3	4	6	5	0	5	4	0	4	2	0	2
Guatemala	1	1	4	6	5	2	0	2	1	0	1	0	0	0
Mexico	167	205	215	218	202	160	27	187	166	30	196	163	33	196
Paraguay	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Peru	16	20	21	24	23	10	6	16	10	7	17	7	5	12
Trinidad	17	14	13	14	13	6	4	10	6	3	9	7	3	10
Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Venezuela	33	47	52	63	69	29	12	41	21	9	30	23	10	33
Subtotal	**382**	**440**	**481**	**521**	**522**	**370**	**81**	**451**	**361**	**78**	**439**	**359**	**84**	**443**
FAR EAST														
Bangladesh	3	2	3	5	5	2	0	2	4	0	4	5	0	5
Brunei	8	8	8	7	10	3	7	10	2	7	9	1	6	7
Burma	18	22	26	30	32	35	1	36	32	1	33	32	1	33
China-offshore	0	8	12	9	10	—	10	10	—	9	9	0	14	14
India	40	40	43	44	50	42	14	56	40	17	57	47	15	62
Indonesia	62	66	77	86	92	62	26	88	56	26	82	56	24	80
Japan	13	15	16	16	22	18	2	20	15	3	18	12	4	16
Korea	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Malaysia	11	13	12	12	13	0	10	10	0	9	9	0	8	8
North Korea	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Pakistan	8	13	14	15	17	17	0	17	17	0	17	18	0	18
Philippines	6	15	12	13	14	7	1	8	3	0	3	2	0	2
Sri Lanka	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taiwan	9	10	12	11	4	4	1	5	5	1	6	5	2	7
Thailand	2	2	5	7	8	6	7	13	5	6	11	4	5	9
Viet Nam	0	2	1	0	0	0	0	0	0	0	0	0	0	0
Subtotal	**181**	**217**	**242**	**255**	**277**	**196**	**79**	**275**	**179**	**79**	**258**	**182**	**79**	**261**

International Active Rig Count (continued)

Region	1978	1979	1980	1981	1982	1983 Land	1983 Off.	1983 Total	1984 Land	1984 Off.	1984 Total	1985 Land	1985 Off.	1985 Total
AFRICA														
Algeria	101	109	111	91	81	54	0	54	27	0	27	35	0	35
Angola	2	6	5	5	11	3	9	12	2	5	7	2	9	11
Benin	0	0	0	0	0	0	0	0	0	1	1	0	1	1
Cameroon	2	4	6	7	7	0	5	5	0	4	4	0	2	2
Chad	1	1	1	1	1	0	0	0	0	0	0	1	0	1
Congo	1	1	4	7	6	0	4	4	0	3	3	0	3	3
Gabon	4	6	8	13	12	0	7	7	1	5	6	1	6	7
Ghana	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Guinea Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ivory Coast	2	3	3	5	5	0	2	2	0	2	2	0	1	1
Kole	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Liberia	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Libya	28	33	41	33	31	23	1	24	24	2	26	28	2	30
Madagascar	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Morocco	4	3	2	5	5	6	0	6	4	0	4	2	1	3
Niger	4	5	5	5	3	0	0	0	0	0	0	0	0	0
Nigeria	16	18	20	23	27	9	8	17	6	5	11	7	3	10
Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Somalia	0	0	0	0	0	0	0	0	0	0	0	1	1	2
South Africa	2	2	2	2	2	0	2	2	0	2	2	1	2	3
Sudan	1	2	2	3	2	4	0	4	2	0	2	1	0	1
Tanzania	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Tunisia	6	7	8	11	11	5	2	7	4	2	6	3	1	4
Zaire	0	1	1	2	2	1	1	2	1	1	2	2	0	2
Subtotal	**175**	**201**	**219**	**213**	**206**	**105**	**41**	**146**	**72**	**32**	**104**	**85**	**33**	**118**
EUROPE														
Austria	9	10	8	9	9	9	0	9	7	0	7	7	0	7
Belgium	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	3	2	2	1	4	5	0	3	3	0	4	4
France	8	11	13	21	22	17	0	17	20	0	20	22	0	22
Germany	22	21	22	26	31	25	0	25	19	0	19	20	0	20
Greece	2	2	3	6	5	2	1	3	3	1	4	1	0	1
Holland	14	17	17	17	21	7	10	17	8	10	18	7	17	24
Ireland	3	2	1	0	0	0	1	1	1	1	2	0	2	2
Italy	18	21	19	32	38	19	7	26	20	6	26	31	9	40
Norway	5	7	11	12	13	0	10	10	0	10	10	0	13	13
Portugal	0	0	0	1	1	1	0	1	0	0	0	0	0	0
Spain	6	5	10	11	12	4	4	8	5	4	9	7	3	10
Switzerland	0	0	1	1	1	0	0	0	0	0	0	0	0	0
United Kingdom	34	34	48	58	58	2	40	42	5	55	60	7	56	63
Yugoslavia	23	22	22	22	24	20	1	21	23	2	25	25	2	27
Subtotal	**144**	**152**	**179**	**218**	**237**	**107**	**78**	**185**	**111**	**92**	**203**	**127**	**106**	**233**
MIDDLE EAST														
Abu Dhabi	16	20	23	31	41	12	23	35	10	19	29	10	11	21
Bahrain	2	1	1	1	1	1	0	1	0	0	0	1	0	1
Dubai	2	1	3	2	3	3	4	7	4	3	7	0	5	5
Egypt	16	21	26	27	36	16	19	35	16	20	36	16	21	37
Iran	53	8	—	—	3	12	1	13	18	2	20	18	2	20
Iraq	29	32	39	14	11	23	0	23	19	0	19	28	0	28
Jordan	0	0	0	0	0	0	0	0	3	0	3	2	0	2
Kuwait	2	2	3	3	4	5	0	5	5	0	5	6	0	6
Oman	6	7	8	10	12	10	1	11	11	1	12	13	0	13
Qatar	6	6	8	7	5	1	2	3	1	1	2	2	1	3
Ra's al Khaymah	1	0	1	1	2	0	1	1	0	0	0	0	0	0
Saudi Arabia	22	22	25	29	29	14	12	26	9	7	16	7	4	11
Sharjah	1	0	1	2	3	1	0	1	0	0	0	0	0	0
South Yemen	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Syria	17	15	15	16	15	15	0	15	23	0	23	26	0	26
Turkey	17	9	24	26	34	26	0	26	24	0	24	25	0	25
Umm al Qawain	1	0	0	1	1	1	0	1	0	0	0	0	0	0
Subtotal	**191**	**144**	**177**	**170**	**200**	**140**	**63**	**203**	**143**	**53**	**196**	**156**	**44**	**200**
SOUTH PACIFIC														
Australia	10	11	15	23	33	15	10	25	24	10	34	22	9	31
Fiji	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Zealand	2	2	2	3	1	2	0	2	1	1	2	3	1	4
Papua New Guinea	0	0	1	0	0	1	0	1	1	0	1	2	0	2
Subtotal	**12**	**13**	**18**	**26**	**34**	**18**	**10**	**28**	**26**	**11**	**37**	**27**	**10**	**37**
Total	**3,613**	**3,682**	**4,627**	**5,636**	**4,792**	**3,098**	**620**	**3,718**	**3,295**	**630**	**3,925**	**2,960**	**619**	**3,579**

Source: Hughes Tool Company
Note: Columns may not add to totals due to independent rounding.

What industry has drilled in the Norphlet play



Well history
ALABAMA STATE WATERS

Block	Well No.	Measured depth (ft)	Flow rate (MMcfd)
18	2	11,020	*
37	1	10,027	*
62	1	20,822	†
63	1	21,000	28.0
72	1	21,315	21.2
76	1	21,113	12.2
76	2	20,981	†
77	1	20,984	19.4
77	2	21,710	†
94	2	21,859	15.5
95	1	20,949	10.5
95	2	3,058	4.0
112	1	Not available	§
115	1	Not available	§

CENTRAL GULF OF MEXICO, MOBILE AREA

Block	Well No.	Measured depth (ft)	Flow rate (MMcfd)
823	1	21,736	26.0
826	1	Not available	§
861	1	Not available	§
864	1	3,050	*
867	1	22,422	32.9
909	1	Not available	§
913	1	Not available	§
952	1	4,270	*
953	1	3,620	*
955	1	4,120	*
996	1	5,705	*

EASTERN GULF OF MEXICO, PENSACOLA AREA

973	1	23,264	*

*Dry hole. †Not flow tested. §Active well.

perforations at 20,634-883 ft. The gas registered a 9% H_2S and 5.1% carbon dioxide content. Permeability of the Norphlet averaged 1.1 md, porosity 10.9%.

The discovery was significant for two reasons. First, the size of the discovery indicated reserves of as much as 600 billion cu ft in the structure. Second, the location of the field significantly extended the area of known Jurassic production—the nearest Jurassic production at the time was Hatter's Pond field about 50 miles to the north in Mobile County, Ala.

Also important, the discovery was the first offshore Jurassic discovery in the northern Gulf of Mexico. The discovery, of course, drew the interest of Mobil's competitors.

Exxon Co. U.S.A., for instance, was aware that seismic shot in the 1970s showed large deep structures in the area, but the company had serious questions about reservoir rock quality. Exxon wasn't convinced that sandstone reservoirs below 20,000 ft could have commercially productive porosity and permeability.

An important clue that sparked Exxon's interest prior to Mobil's discovery came when an onshore wildcat Exxon was drilling north of Mobile, Ala., encountered aeolian sand deposits in the Norphlet rather than the river deposited Norphlet sands usually found in the area.

Regional work by Exxon seemed to confirm a major depositional change in the Norphlet to the south that had been detected in the wildcat north of Mobile. Instead of a thin, stream like deposit as in onshore Norphlet fields to the north, the Norphlet changed into wind blown dune deposits that tend to be thick with few shale partings. Porosity was generally good.

The Mobil discovery confirmed the company's conjecture.

State geologists now believe the sand dunes may have been part of a desert in the Jurassic age similar to today's great deserts of North Africa and the Middle East. The desert plain was rimmed to the north and east by the Appalachians and to the southwest by a developing shallow sea.

Norphlet conglomerates were deposited in coalescing alluvial fans in proximity to an Appalachian source, and red beds accumulated in distal portions of alluvial fan and wadi systems.

Quartzose sandstones were deposited as dune and interdune sediments on a broad desert plain. A marine transgression was initiated in late Norphlet time resulting in the reworking of previously deposited Norphlet sediments.

HEAT EXCHANGERS (right) and air coolers are installed at Mobil Oil Exploration & Producing Southeast Inc.'s 80 MMcfd gas processing plant 4 miles west of Alabama Port on Mobile Bay. The plant, which occupies about 40 acres within a 1,600 acre tract owned by Mobil, will process production from Mobil's Mary Ann field—the first Jurassic Norphlet deep gas development project in the Gulf of Mexico.

on 444 tracts.

The Western Gulf OCS Sale 102 in August was another story. In OCS Sale 102 only 54 companies took part and placed 265 offers on 210 blocks with high bids amounting to $391 million. The previous year's OCS Sale 84 for the same region saw $945 million in high bids.

Being a gas prone area, the western Gulf of Mexico has not attracted a great deal of interest since oversupply and falling prices have hampered gas producers' ability to market their product.

Despite the problems in the gas market, many observers felt the Eastern Gulf of Mexico OCS Sale 94 would draw significant interest as operators move to extend the boundaries of the deep Norphlet gas play reaping substantial success offshore Alabama. The December 1985 sale, however, drew high bids on 84 tracts amounting to only $124,022,098, compared to the $310.5 million shelled out for the eastern Gulf sale in 1984.

Table 2

Comparison of 1984-85 drilling costs in Gulf of Mexico

Drilling depth (ft)	Type	1985 avg. daily cost (000)	1984 avg. daily cost (000)	1985 med. daily cost (000)	1984 med. daily cost (000)
0-5,000	Oil	$135	$611	$123	$523
	Gas	$163	$532	$123	$532
5-10,000	Oil	$302	$517	$200	$425
	Gas	$299	$435	$200	$425
10-15,000	Oil	$290	$540	$173	$510
	Gas	$290	$540	$173	$510
15-20,000	Oil	$391	$551	$210	$510
	Gas	$367	$551	$216	$510

New frontier

Many operators, however, continue to view the eastern Gulf of Mexico as an exciting new frontier, particularly the region off the Florida Panhandle that many believe contains extensions of the prolific Smackover and Norphlet sands onshore.

The pace of operations in the Gulf of Mexico is affected by the natural gas market. One operator estimated that 70% of his production in the Gulf of Mexico on a net equivalent barrel basis is natural gas; the average for most operators is in the 60% to 70% range.

Exploration activity in the Gulf of Mexico is being seriously undermined by the gas oversupply and continually falling prices. Many observers earlier felt 1985 would be a spectacular year for jack-up utilization in the Gulf, but below-cost day rates were sharply offset by low gas prices resulting from the oversupply of natural gas. In the very early days of 1986, jack-up utilization in the Gulf reached 80%-82%, much of the improvement being credited to development drilling and the heated activity in Mobile Bay off Alabama.

At the end of 1985 only two dry holes had been reported in the shallow waters off Alabama. The majority of the discoveries in the deep gas formations has been from wells characterized by extremely thick pay zones.

The primary objective has been the Upper Jurassic Norphlet sediments at depths of more than 20,000 ft below the seafloor. Discoveries off Alabama have resulted in flow rates exceeding 30 MMcfd.

Interest in the offshore Alabama area increased in 1979 when Mobil Exploration and Producing Southeast Inc. (Moepsi) brought in the Mary Ann field on State Tract 76. Six wells drilled to test the Norphlet in the field all yielded gas with flow rates ranging from 10.5 to 19.4 MMcfd.

The first production from Mobile Bay will begin later this year when Mary Ann comes on stream at an expected initial rate of 55 MMcfd. The production rate will increase as additional wells, treatment, and transportation facilities are completed as part of a $450 million development program.

Spurred by the success off Alabama, the waters off Mississippi and Florida began to draw interest last year as operators attempted to extend the Norphlet. Between 1984 and 1985 the rig utilization rate in the eastern Gulf or Mafla jumped three-fold.

Recent drilling activity suggests operators are intent on finding the outermost fringes of the Norphlet. A well drawing attention in early 1986 was the extremely deep wildcat on Viosca Knoll Block 117, about 20 miles south of Exxon's significant discovery on Mobil Block 867. At a targeted depth of 24,500 ft the well, if it reaches total depth, would set a Gulf record.

Florida officials, stung by the lack of success in the once promising Destin Dome region, are confident the well could provide clues as to whether the Norphlet extends along that state's coastline. "We believe there is some good Norphlet on the southwest side of the fault system that runs into the Destin Dome," one Florida state geologist said late last year.

Earlier last year Chevron successfully extended the Norphlet to the west with a wildcat on Mobil OCS Block 861 off Mississippi. A test flowed 11.2 MMcfd from a pay zone encountered at 21,630 ft. A confirmation well was being drilled at year-end 2,000 ft. east of the initial find.

To the east, speculation had centered on a well being drilled by Shell Oil Co. on Destin Dome Block 160. Late last year, however, Shell plugged and abandoned the hole without announcing the depth. At years-end many continued to speculate the well was successful, based on the company's interest in the region during the Eastern OCS Gulf of Mexico sale.

Another bright spot in the Gulf is the deepwater Garden Banks and Mississippi Canyon areas, known as the Flexure Trend. Despite promising structures and some sizeable discoveries made thus far, the Flexure Trend has lost some of its bloom, in part because:

- **Difficult geology.** Delineation drilling is revealing that what were first thought to be large concentrated reserves are now found to be widely scattered and discontinuous.
- **Complex development solutions.** In order to recover sufficient reserves, any kind of producing structure will also have to be accompanied by a number of directional wells and satellite production facilities.

While the trend continues to hold promise, its real value, according to Gulf exploration managers, is that it indicates there are still larger reserves in the surrounding deeper water. Many believe operators are selectively searching the wider flexure area for the larger reserves and consequently may hold off development until the entire sector can be properly evaluated.

As of early 1986 some 210 wells have been drilled beyond the 656 ft water depth mark in the Gulf, primarily centered in the Green Canyon, Ewing Bank and Garden Banks area.

Offshore magazine predicts about 1,310 wells will be drilled in the Gulf of Mexico this year. The number will be down significantly, according to the prediction, from the estimated 1,450 wells expected to have been completed in the Gulf last year.

The primary cause of the lower well count will be the after affects of restructuring and buyouts. The need to drill Gulf tracts before leases expire and the lowest drilling costs in

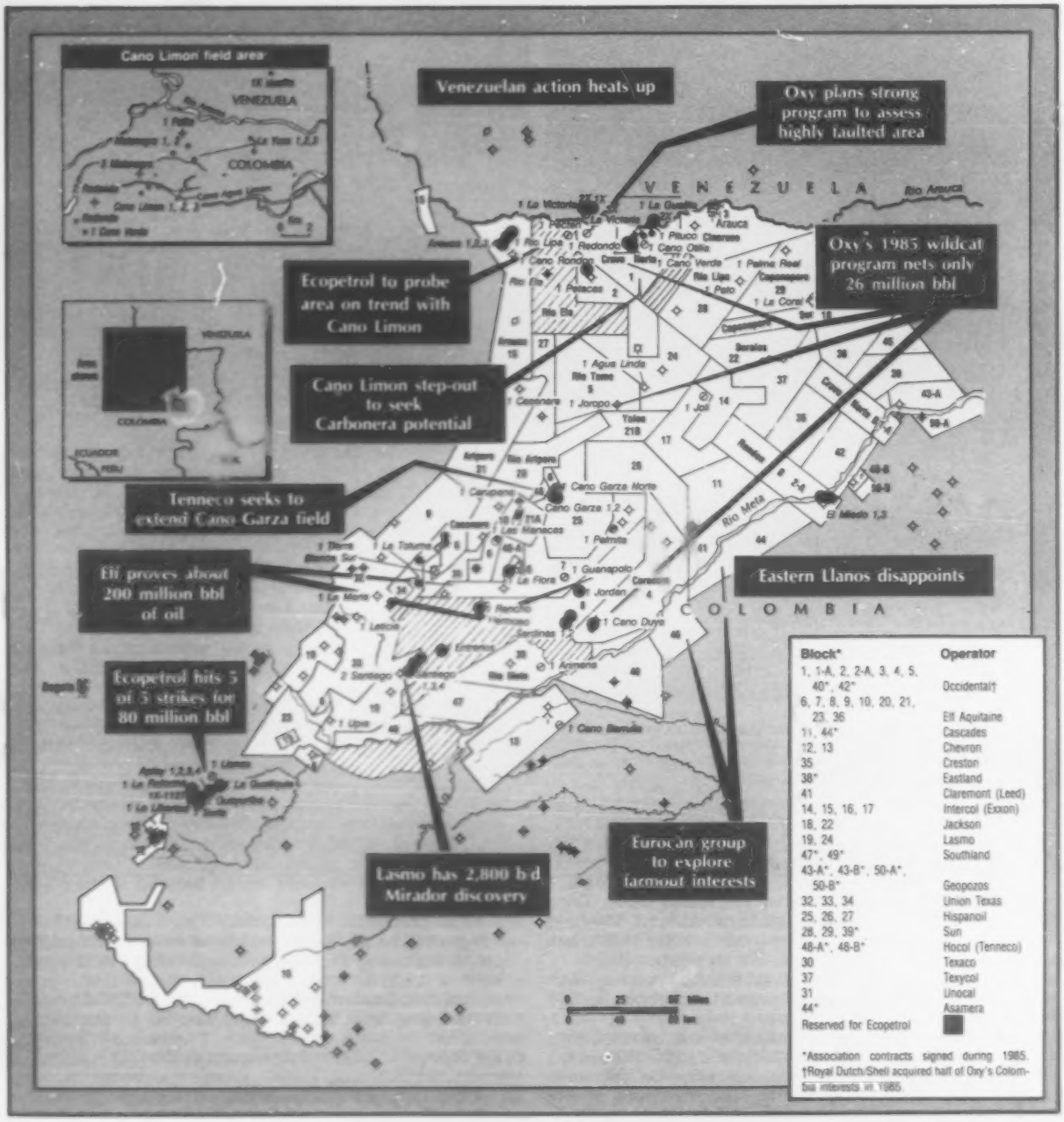
Production depth records in U.S.

State, area	Well	Location	County Parish	Year	Deepest perf	Pay zone
Texas	Chevron 1-21 Ruth Ledbetter	21-L-J.M. Lindsay	Wheeler	1977	26,536	Ellenburger gas
Oklahoma	Leede Oil & Gas 1-29 McCall	29-11n-25w	Beckham	1985	25,000	Hunton gas
Wyoming	Monsanto Oil 1-5 Bighorn	5-38n-90w	Fremont	1985	23,902	Madison & Bighorn gas
Louisiana	Texaco 1 S.L. 4666	Caillou Island	Terrebonne	1969	21,862	Miocene oil
Alabama	Exxon 1 OCS-G-5066	Block 867	Off Mobile	1984	21,838	Norphlet gas
Mississippi	Shell Oil 5-A Cox	29-3n-3e	Rankin	1976	21,727	Norphlet gas
Calif. offshore	Texaco 3 OCS-P-0234	Pitas Point	. . .	1977	18,309	Gas
California	Tenneco 66X Tenneco-Union-GBP	3-27s-22e	Kern	1975	18,060	Vedder oil
Utah	Gulf Oil 1-34-Z-3 Ute Tribal	34-1n-3w	Duchesne	1974	17,732	Wasatch oil
Colorado	Champlin 44-27 Shell Creek	27-12n-99w	Moffat	1977	17,632	Nugget gas
New Mexico	Union Oil 1 Red Hills Unit	32-25s-33e	Lea	1964	17,544	Devonian gas
Florida	Exxon 13-3 St. Regis	13-4n-29w	Santa Rosa	1972	16,130	Norphlet oil
Alaska	Marathon Oil 4 Beaver Creek	Seward Meridian	. . .	1973	14,952	Tyonek oil
North Dakota	Patrick Petroleum 1-17 Enderud	17-152n-98w	McKenzie	1981	14,636	Red River gas
West Virginia	Exxon 1 McCoy	Washington dist.	Jackson	1975	14,300	Rome gas
Pennsylvania	Texaco 1 S.T. 289	Slate Run quad.	Lycoming	1985	13,186	Ordovician gas
Montana	Sun Oil 1 Panasuk	20-29n-59e	Roosevelt	1980	13,012	Red River oil
Michigan	Amoco Production 2-36 Letts	36-18n-1w	Gladwin	1985	11,252	Prairie du Chien gas
Arkansas	W. H. Hunt 1 Nations	. . .	Columbia	1969	11,195	Smackover gas
South Dakota	Depco Inc. 41-22 Otterness	22-23n-5e	Harding	1973	9,150	Red River oil
Maryland	Cumberland & Allegheny 604 Smith-Kerr Unit	. . .	Garrett	1966	8,658	Oriskany gas
Ohio	Gas Corp. of America 1 Danford	Noble twp.	Noble	1973	8,488	Rose Run gas
Kentucky	Inland Gas Corp. 529 White	. . .	Boyd	1967	7,598	Antietam oil
Nebraska	Sun E&P 1 Tipsword	35-16n-59w	Kimball	1985	7,464	Dakota J oil
Nevada	Texota 1-34 Eagle Springs Unit	34-9n-57e	Nye	1967	7,256	Tertiary oil
Virginia	Clinchfield Coal Co. 193	. . .	Dickenson	1957	7,238	Devonian shale gas
Arizona	Texaco 1-Z Navajo	36-41n-30e	Apache	1960	6,793	Devonian oil
Kansas	Mobil Oil 1 Creamer Estate	13-34s-37w	Stevens	1967	6,774	St. Louis gas
New York	Transamerican Petroleum 1 Wellman	Middlebury twp.	Wyoming	1963	5,425	Theresa gas
Illinois	Moore Engineering 8 Gray Estate	30-3s-8e	White	1980	5,405	Devonian oil
Tennessee	Amoco-Anschutz 1 Reed Unit	10-1s-74e	Hancock	1981	4,624	Knox gas
Indiana	V. R. Gallagher 1 Chilton	3-5s-14w	Posey	1977	4,508	Harrodsburg oil
Washington	J. W. Tanner-Sunshine Mining 1 Medina	. . .	Grays Harbor	1957	4,118	Miocene oil
Oregon	American Quasar 9-12 Hicken	Lebanon field	Linn	1981	3,027	Eocene gas
Missouri	William Gruenerwald & Assoc. 1 Currie	. . .	Holt	1959	2,975	Ordovician oil

Drilling depth records in U.S.

State, area	Well	Location	County	Year	Total depth	Result	Type
Oklahoma	Lone Star 1 Rogers	27-10n-19w	Washita	1974	31,441	Granite Wash gas	Wildcat
Texas	Hunt Energy 1 Cerf Ranch	9-130-T&STL	Pecos	1982	29,670	Dry	Wildcat
Wyoming	Rainbow Resources 1 Pacific Creek-Federal	34-27n-103w	Sublette	1979	25,764	Dry	Wildcat
S. Louisiana	Martin Exploration 1 Echart	40-4s-4e	St. Landry	1981	25,703	Dry	Wildcat
Mississippi	FMP Operating 1 Wilson Estate	19-6n-2w	Adams	1986	25,500	Dry	LaGrange
N. Louisiana	Sohio Petroleum 1 L.W. Magoun	23-7n-7e	Concordia	1985	25,015	Dry	Wildcat
Ala. offshore	Mobil Oil 1 OCS-G-3886	Pensacola area	Off Baldwin	1981	23,264	Dry	Wildcat
California	Tenneco 64-X-34 Sandhills	34-32s-28e	Kern	1975	22,711	Dry	Wildcat
Mass. Offshore	USGS G-2 COST	Block 141	Georges Bank	1977	21,874	Dry	Strat
Utah	Texaco 1 Thousand Peaks Ranching	12-1n-8e	Summit	1981	21,874	Dry	Wildcat
Pennsylvania	Amoco Production 1 Svetz	Kingwood quad.	Somerset	1974	21,460	Dry	Wildcat
Alabama	Damson Oil 1 Tyler-Odom	13-3n-4w	Washington	1971	20,434	Dry	Wildcat
Alaska	Husky Oil/USGS 1 Tunalik	20-10n-36w	Wainwright quad.	1981	20,334	Dry	Wildcat
West Virginia	Exxon 1 Gainer-Lee	Arnoldsburg quad.	Calhoun	1974	20,222	Dry	Wildcat
Colorado	Mobil Oil 52-19-G Piceance Creek	19-2s-96w	Rio Blanco	1968	19,710	Dry	Wildcat
Nevada	Mobil Oil 1-A Virgin River-USA	9-15s-58e	Clark	1980	19,562	Dry	Wildcat
Florida	Bass Enterprises 12-2 Collier	12-52s-27e	Collier	1975	18,670	Dry	Wildcat
N.J. offshore	Gulf Oil 1 OCS-A-0059	Block 857	Baltimore Canyon	1979	18,554	Dry	Wildcat
Idaho	Exxon 1 Myers-Federal Unit	14-14n-35e	Clark	1982	18,540	Dry	Wildcat
Calif. offshore	Texaco 3 OCS-P-0234	Santa Cruz area	Pitas Point	1977	18,318	Dry	Wildcat
Arizona	Phillips Petroleum 1-A State	2-7s-1e	Pinal	1981	18,013	Dry	Wildcat
Montana	ARCO Exploration 1 Gibbs	2-28n-27w	Flathead	1984	17,774	Dry	Wildcat
Washington	Shell Oil 1-9 BN	9-15n-25e	Grant	1983	17,518	Dry	Wildcat
Michigan	McClure Oil 1-8 Sparks	8-10n-2w	Gratiot	1978	17,466	Dry	Wildcat
Arkansas	MRT/Harvey Broyles 1 Douglass	27-12n-26w	Hempstead	1979	17,349	Dry	Wildcat
Virginia	Gulf Oil 1 Price	Hansonville quad.	Russell	1976	17,003	Dry	Wildcat
North Dakota	Gulf Oil 1-3-4A Zabolotny	3-144n-98w	Billings	1978	15,380	Miss. oil & Gas	Little Knife
Kentucky	Exxon 1 Duncan	5-M-22	Webster	1977	15,200	Dry	Wildcat
Illinois	Texas Pacific 1 Streich Comm.	2-11s-6e	Pope	1976	14,942	Dry	Wildcat
New York	New York State Natural Gas 1 Olin	Woodhull quad.	Steuben	1958	13,500	Gas	....
Wash. offshore	Shell Oil 1A ET OCS-P-0150	Cape Flattery area	Off Pacific	1966	13,179	Dry	Wildcat
Oregon	Mobil Oil 1 Sutherlin Unit	36-24s-5w	Douglas	1979	13,177	Dry	Wildcat
Oregon offshore	Standard Oil (Calif.) 1 OCS-P-0103	Newport area	....	1965	12,628	Dry	Wildcat
Maryland	Texas Eastern 2 Bowman Siebert	Accident quad.	Garrett	1973	11,617	Gas storage	....
Tennessee	ARCO Exploration 1 Sanford Heirs	21-4s-64e	Anderson	1982	11,540	Dry	Wildcat
Georgia	Chevron 1 Snipes	Snipesville area	Jeff Davis	1981	11,470	Dry	Wildcat
Ohio	Amerada Petroleum 1 Ullman	Dalzel quad.	Noble	1967	11,442	Shallow oil, gas	....
Kansas	Texaco 1 Noel Poersch	31-5s-5e	Washington	1984	11,300	Dry	Wildcat
North Carolina	Standard Oil (N.J.) 1 Hatteras Light	....	Dare	1946	10,054	Dry	Wildcat
Nebraska	Chevron 1 Duncan-Compton	31-16n-58w	Kimball	1979	9,971	Dry	Wildcat
South Dakota	Kenneth Luff 1-19 Dworshak	19-23n-6e	Harding	1977	9,771	Oil	....
Hawaii	Barnwell Geothermal 1 Lani Puna	Kapoha area	Hawaii	1981	8,350	Geothermal	....
Indiana	General Electric 2 Industrial	19-7s-37w	Posey	1971	7,980	Disposal	....
Minnesota	Longyear Drilling 1 Hattenburger	2-46n-21w	Carlton	1978	7,440	Dry	Wildcat
Vermont	Columbia Gas 1 Burnor	Fairfield area	Franklin	1984	6,970	Dry	Wildcat
New Jersey	Anchor Gas 1 Dickerson	Cape May quad.	Cape May	1964	6,407	Dry	Wildcat
South Carolina	Essex Oil & Gas 1 Lightsey	5 mi w/Williams	Colleton	1984	6,000	Dry	Wildcat
Iowa	Iowa First Oil Development 1 Wilson	24-68n-37w	Page	1934	5,305	Dry	Wildcat
Missouri	Mammoth Oil 1 Big Oak Farm	7-24n-17e	Mississippi	1966	4,909	Dry	Wildcat
Wisconsin	Wisconsin Oil Refining 1 Jensema	Gibbsville area	Sheboygan	1949	4,405	Dry	Wildcat
Delaware	Cleveland Petroleum 1 Apple Orchard	....	Sussex	1935	3,012	Dry	Wildcat

Colombia's Llanos wildcat focus narrows


Cano Limon field area
Venezuelan action heats up
Oxy plans strong program to assess highly faulted area
Ecopetrol to probe area on trend with Cano Limon
Oxy's 1985 wildcat program nets only 26 million bbl
Cano Limon step-out to seek Carbonera potential
Tenneco seeks to extend Cano Garza field
Elf proves about 200 million bbl of oil
Eastern Llanos disappoints
Ecopetrol hits 5 of 5 strikes for 80 million bbl
Lasmo has 2,800 b/d Mirador discovery
Eurocan group to explore farmout interests
VENEZUELA
COLOMBIA
Rio Arauca
Rio Meta
Block* Operator
1, 1-A, 2, 2-A, 3, 4, 5, 40*, 42* Occidental†
6, 7, 8, 9, 10, 20, 21, 23, 36 Elf Aquitaine
11, 44* Cascades
12, 13 Chevron
35 Creston
38* Eastland
41 Claremont (Leed)
14, 15, 16, 17 Intercol (Exxon)
18, 22 Jackson
19, 24 Lasmo
47*, 49* Southland
43-A*, 43-B*, 50-A*, 50-B* Geopozos
32, 33, 34 Union Texas
25, 26, 27 Hispanoil
28, 29, 39* Sun
48-A*, 48-B* Hocol (Tenneco)
30 Texaco
37 Texycol
31 Unocal
44* Asamera
Reserved for Ecopetrol
*Association contracts signed during 1985.
†Royal Dutch/Shell acquired half of Oxy's Colombia interests in 1985.

to crack down on the cocaine trade—upon which so much of its economy surreptitiously relies—and offer new employment and services in once-neglected regions that have become breeding grounds for insurgents.

Cano Limon giant

Meanwhile, the massive project to develop and transport oil from Cano Limon field, the strike that started it all, has moved at breakneck speed.

Oxy is operator for itself and Co. Shell de Colombia Inc. and Ecopetrol. The Royal Dutch/Shell unit acquired half of Oxy's Colombian interests last year for more than $1 billion.

The project entails field production facilities capable of handling about 360,000 b/d of gross fluids, or about 250,000 b/d of oil. Cano Limon field development calls for about 71 producers in all, plus another 15 injectors for waterflood—which doesn't seem likely at this point due to the field's strong water drive.

The 2 billion bbl plus OOIP Cano Limon is viewed by Oxy

Worldwide oil and gas at a glance

COUNTRY	ESTIMATED PROVED RESERVES 1-1-1986 Oil (1,000 bbl)	Gas (10^9 cu ft)	OIL PRODUCTION Producing wells** July 1, 85	Estimated 1985 (1,000 b/d)	% change from 1984	REFINING Capacity (b/cd) Jan. 1, 1986 No. of ref.	Crude	Thermal operations	Catalytic cracking	Catalytic reforming
ASIA-PACIFIC										
Australia	1,449,000	18,220	746	556.0	+13.0	11	622,610	...	178,800	157,220
Bangladesh	...	11,800	...	...	...	1	31,200	...	...	1,650
Brunei	1,480,000	7,400	629	149.5	− 6.6	1	10,000	...	...	...
Burma	65,500	160	445	30.0	...	2	26,300	1,700	...	...
China, Taiwan	[6]5,500	811	84	2.7	+ 3.8	2	542,500	3,933	22,600	51,960
India	3,736,000	16,880	2,201	614.0	+16.1	12	866,682	104,730	104,070	28,490
Indonesia	8,500,000	35,600	5,378	1,219.5	−14.3	6	635,800	81,500	...	60,700
Japan	62,000	1,100	256	10.0	+25.0	44	4,613,400	80,520	472,750	543,950
Korea, South	...	...	...	...	...	6	782,000	42,990	...	59,454
Malaysia	3,100,000	52,700	370	432.8	− 0.1	4	212,300	...	...	20,900
New Zealand	[6]176,000	5,515	28	18.0	+ 5.9	1	53,000	...	...	18,000
Okinawa	...	...	...	...	...	3	110,000	...	...	7,400
Pakistan	109,000	15,400	51	34.3	+101.8	3	130,000	...	...	5,750
Papua New Guinea	[6]50,000	500	...	...	...	...	...	...	...	...
Philippines	16,300	11	9	9.3	−19.1	3	216,000	...	23,100	33,400
Singapore	...	...	...	...	...	5	1,018,000	133,000	...	49,600
Sri Lanka	...	...	...	...	...	1	50,000	12,500	...	3,750
Thailand	107,000	5,400	184	34.3	+90.6	3	191,860	9,600	9,250	25,300
Total Asia-Pacific	**18,856,300**	**171,497**	**10,381**	**3,110.4**	**− 0.8**	**108**	**10,111,652**	**470,473**	**810,570**	**1,067,524**
WESTERN EUROPE										
Austria	110,000	520	1,605	21.7	− 5.7	1	204,000	17,000	24,000	31,000
Belgium	...	...	...	...	...	4	652,100	65,500	100,500	78,200
Cyprus	...	...	...	...	...	1	16,000	...	...	3,400
Denmark	465,000	3,900	NA	58.0	+23.4	3	166,000	72,800	...	29,100
Finland	...	...	...	...	...	2	241,000	46,300	41,800	55,100
France	230,000	1,400	601	49.0	+40.0	16	1,946,850	145,200	258,300	271,100
Germany, West	292,000	6,424	3,152	80.5	+ 1.9	22	1,932,800	282,400	183,200	355,500
Greece	34,600	3,000	15	26.4	− 2.2	4	390,000	19,520	23,000	31,200
Ireland	...	900	...	...	...	1	56,000	...	...	11,000
Italy-Sicily	740,000	5,000	195	41.7	− 7.3	21	2,738,100	306,630	273,500	311,800
Netherlands	251,000	67,070	644	69.0	+13.1	7	1,468,350	120,010	122,500	148,400
Norway	10,900,000	104,000	178	771.0	+10.6	3	240,000	90,500	...	29,150
Portugal	...	...	...	...	...	3	295,607	...	10,141	35,909
Spain	90,000	700	43	45.3	− 1.5	10	1,367,000	124,000	87,500	193,100
Sweden	...	...	...	...	...	6	429,000	72,444	26,666	74,588
Switzerland	...	3	...	...	...	2	137,000	24,000	...	25,000
Turkey	300,000	490	449	41.5	+ 1.2	4	460,475	...	38,600	45,057
United Kingdom	13,000,000	33,000	627	2,519.8	+ 1.0	15	1,791,700	166,000	363,500	368,500
Total Western Europe	**26,412,600**	**226,407**	**7,509**	**3,723.9**	**+ 3.6**	**125**	**14,531,982**	**1,552,304**	**1,553,207**	**2,097,104**
MIDDLE EAST										
Abu Dhabi	31,000,000	20,500	254	705.1	−10.0	3	185,250	...	...	29,569
Bahrain	155,000	7,103	271	41.9	+ 2.2	1	250,000	19,000	36,000	17,100
Dubai	1,400,000	4,400	152	348.0	+ 2.5	...	...	...	...	...
Iran	47,876,000	470,000	361	2,279.0	+ 4.8	4	530,000	80,800	...	63,845
Iraq	44,110,000	29,000	NA	1,396.8	+15.4	8	318,500	...	...	43,500
Israel	710	10	9	0.1	...	2	170,000	62,000	18,000	24,500
Jordan	...	...	...	...	...	1	100,000	...	4,410	8,640
Kuwait	89,774,000	32,500	572	823.3	−12.1	5	633,600	...	...	51,000
Lebanon	...	...	...	...	...	2	17,000	...	...	3,100
Neutral Zone	5,380,000	8,210	493	357.8	−18.5	...	...	...	...	...
North Yemen	200,000	...	...	...	...	...	...	...	...	...
Oman	4,000,000	6,000	641	484.3	+16.7	1	48,082	...	...	9,644
Qatar	3,300,000	148,000	174	297.0	−25.0	1	56,058	...	...	10,463
Ras Al Khaimah	100,000	400	4	9.1	+56.9	...	...	...	...	...
Saudi Arabia	168,800,000	121,000	NA	3,295.3	−26.2	5	1,115,000	30,000	10,000	87,900
Sharjah	490,000	7,500	19	66.1	+ 6.1	...	...	...	...	...
South Yemen (Aden)	...	...	...	...	...	1	161,500	...	...	10,800
Syria	1,440,000	1,240	847	161.7	− 4.9	2	228,790	41,199	...	19,348
Total Middle East	**398,025,710**	**855,863**	**3,797**	**10,265.5**	**−10.3**	**36**	**3,813,780**	**232,999**	**68,410**	**379,409**

EDITOR'S NOTE: All reserves figures except those for the U.S.S.R. (and gas for Canada) are reported as proved reserves recoverable with present technology and prices. U.S.S.R. figures are "explored reserves" which include proved, probable, and some possible. Canadian gas figure, under criteria adopted by Canadian Petroleum Association in 1980, includes proved and some probable. [6]Condensate. *U.S. reserves numbers based on Energy Information Administration estimates which ran some 3 billion bbl and 11 trillion cu ft higher than API/AGA estimates for 1979, the last year the latter two associations provided estimates. †Estimates based on capacity as of Jan. 1, 1985, plus known 1985 closures and expansions. ††Includes Albania, Bulgaria, Cuba, Czechoslovakia, East Germany, Hungary, Mongolia, North Korea, Poland, Rumania, Viet Nam, and Yugoslavia. **Does not include shut in, injection, or service wells.

COUNTRY	ESTIMATED PROVED RESERVES 1-1-1986		OIL PRODUCTION			REFINING Capacity (b/cd) Jan. 1, 1986				
	Oil (1,000 bbl)	Gas (10^9 cu ft)	Producing wells** July 1, 85	Estimated 1985 (1,000 b/d)	% change from 1984	No. of ref.	Crude	Thermal operations	Catalytic cracking	Catalytic reforming
AFRICA										
Algeria	8,820,000	107,080	NA	643.3	+ 5.8	4	464,700	...	...	55,600
Angola-Cabinda	2,000,000	1,870	298	228.5	+ 9.9	1	32,100	...	...	1,900
Benin	100,000	...	6	6.9	...	...	...	...	...	...
Cameroon	555,000	3,880	173	133.5	+ 6.8	1	43,000	...	...	6,500
Congo	650,000	2,470	272	115.1	− 2.3	1	21,000	...	...	2,000
Egypt	3,850,000	7,060	658	885.8	+ 7.1	6	434,150	16,470	...	30,870
Ethiopia	...	...	...	...	...	1	18,000	...	...	2,200
Gabon	520,000	420	297	150.0	...	1	23,000	7,200	...	1,400
Ghana	3,800	4	3	2.0	...	1	28,000	...	...	5,550
Ivory Coast	125,000	2,118	20	28.0	+ 3.7	2	90,000	...	...	14,600
Kenya	...	...	...	...	...	1	95,000	...	...	9,000
Liberia	...	...	...	...	...	1	15,000	...	...	2,000
Libya	21,300,000	21,390	671	1,045.3	− 4.2	3	329,800	...	...	14,182
Madagascar	...	...	...	...	...	1	16,350	...	...	2,600
Morocco	250	...	...	...	...	2	81,303	...	5,600	13,735
Mozambique	...	...	...	...	...	1	17,000	...	...	2,500
Nigeria	16,600,000	47,000	1,153	1,445.5	+ 2.2	3	250,400	...	44,100	38,100
Senegal	...	...	...	...	...	1	29,800	...	...	2,870
Sierra Leone	...	...	...	...	...	1	10,000	...	...	...
Somalia	...	...	...	...	...	1	10,000	...	...	...
South Africa	...	...	...	...	...	5	388,500	59,500	80,000	62,500
Sudan	300,000	...	...	...	...	1	23,800	...	...	1,700
Tanzania	...	800	...	...	...	1	13,500	...	...	3,000
Togo	...	...	...	...	...	1	20,000	...	...	4,400
Tunisia	1,800,000	4,200	140	125.0	+ 4.2	1	34,000	...	...	3,300
Zaire	110,000	30	17	30.5	+13.0	1	17,000	...	...	3,000
Zambia	...	...	...	...	...	1	25,000	...	...	5,600
Total Africa	**56,734,050**	**198,322**	**3,708**	**4,839.4**	**+ 2.4**	**44**	**2,530,403**	**83,170**	**129,700**	**289,187**
WESTERN HEMISPHERE										
Argentina	2,300,000	23,588	8,581	447.5	− 4.0	11	667,200	124,800	105,850	38,300
Barbados	400	...	73	1.9	+11.8	1	3,000	...	...	...
Bolivia	154,000	4,700	346	20.0	...	3	46,930	...	...	14,158
Brazil	2,070,000	3,060	3,514	540.5	+16.2	13	1,305,100	19,900	321,900	21,600
Canada	6,500,000	99,700	43,480	1,453.0	+ 1.3	28	1,855,800	74,160	377,000	352,700
Chile	726,000	2,300	266	32.5	−14.5	2	141,000	8,400	34,000	5,300
Colombia	1,224,000	4,130	2,709	178.8	+ 6.4	4	211,000	61,000	91,000	6,000
Costa Rica	...	...	...	...	...	1	15,200	...	...	1,300
Dominican Republic	...	...	...	...	...	2	44,000	...	...	8,300
Ecuador	1,650,000	4,090	816	273.3	+ 5.9	3	87,600	12,600	12,600	2,780
El Salvador	...	...	...	...	...	1	16,300	...	...	2,800
Guatemala	50,000	30	8	3.1	−38.0	1	16,000	...	...	3,000
Honduras	...	...	...	...	...	1	14,000	...	...	1,800
Jamaica	...	...	...	...	...	1	35,500	...	...	3,540
Martinique	...	...	...	...	...	1	12,800	...	...	3,000
Mexico	49,300,000	76,954	3,209	2,797.0	+ 1.7	9	1,269,000	82,000	297,000	163,800
Netherlands Antilles	...	...	...	...	...	1	320,000	67,000	42,000	15,000
Nicaragua	...	...	...	...	...	1	14,500	...	...	2,800
Panama	...	...	...	...	...	1	100,000	...	...	7,500
Paraguay	...	...	...	...	...	1	7,500	...	...	...
Peru	636,000	852	3,572	189.0	+ 2.7	6	175,560	...	21,670	1,680
Puerto Rico	...	...	...	...	...	2	121,000	...	12,000	5,800
Suriname	1,000	...	23	1.0	+25.0	...	...	...	...	...
Trinidad & Tobago	540,000	10,500	3,157	179.0	+ 5.3	2	260,000	18,000	25,000	29,000
Uruguay	...	...	...	...	...	1	45,000	...	5,000	3,000
Venezuela	25,591,000	59,067	10,103	1,669.0	− 2.5	7	1,229,700	122,000	179,400	6,000
Virgin Islands	...	...	...	...	...	1	600,000	40,000	...	125,000
United States	*28,000,000	*197,000	642,000	8,919.0	+ 0.5	†191	†15,182,000	†1,810,100	†5,165,000	†3,571,000
Total Western Hemisphere	**118,742,400**	**485,971**	**721,857**	**16,704.6**	**+ 0.9**	**296**	**23,795,690**	**2,439,960**	**6,689,420**	**4,495,158**
Total non-Communist	**618,771,060**	**1,938,060**	**747,252**	**38,643.8**	**− 2.0**	**609**	**54,783,507**	**4,778,906**	**9,251,307**	**8,328,302**
COMMUNIST AREAS										
China	18,420,000	30,000	NA	2,474.0	+ 9.0	20	2,150,000	NA	NA	NA
U.S.S.R.	61,000,000	1,500,000	121,000	11,905.0	− 2.6	38	12,200,000	NA	NA	NA
Other††	1,950,000	16,000	NA	461.0	− 5.1	45	3,150,000	NA	NA	NA
Total Communist	**81,370,000**	**1,546,000**	**121,000**	**14,840.0**	**−1.0**	**103**	**17,500,000**	**NA**	**NA**	**NA**
TOTAL WORLD	**700,141,060**	**3,484,060**	**868,252**	**53,483.8**	**−1.7**	**712**	**72,283,507**	...	...	...

Worldwide Production

• Offshore (e) Estimated (c) Condensate (NA) Not available

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
ABU DHABI								
AMERADA GROUP	• Arzanah, 1973	11,000-11,300						42.0
CFP GROUP	• Abu Al Bukhoosh, 1969	8,900-10,900						32.0
	• Mubarras, 1969	8,300-10,000						37.0
	• El Bunduq, 1964	9,400-10,900						40.0
ADHOC	Asab, 1965	8,000- 8,700						41.0
	Bab, 1958	8,600- 9,300	349	43	349	705,146	7,532,426,446	44.0
	Bu-Hasa, 1962	8,300- 9,200						39.0
	Sahil, 1967	9,500- 9,800						41.0
	• Umm Shaif, 1958	9,800-12,000						37.0
	• Upper Zakum, 1964	9,150						39.0
	• Lower Zakum, 1964	9,100						39.0
	Zakum, 1963	9,600-12,000						40.0
	Total Abu Dhabi		**349**	**43**	**349**	**705,146**	**7,532,426,446**	
ALGERIA[e] SONATRACH	Zarzaitine, 1957	4,700						42.2
	Edjeleh, 1956	1,500- 2,800						37.2
	Tiguentourine, 1966	2,160- 4,265						44.4
	El Adeb Lareche, 1958	4,100						43.3
	Assakaifaf N. & S., 1958	2,800						42.7
	Tan Emellel N. & S., 1960	2,800- 4,500						42.5
	Edeyen, 1964	5,580						41.5
	Hassi Mazoula S., 1963	4,430						40.2
	Hassi Mazoula B., 1965	4,920						42.0
	Acheb W. & Kreb, 1963 & 1960	7,360						45.6
	Tin Fouye N. +F6, 1962	4,265						39.6
	El Borma, 1967	8,200						42.9
	Keskassa, 1968	8,860						42.9
	Mereksen, 1974	9,420						45.8
	Gara, 1962	9,420						42.9
	Hassi Messaoud N., 1956	10,500						45.9
	Hassi Messaoud S., 1956	10,500						46.1
	Gassi-Touil & Gassi-Touil E., 1961	6,890						50.6-50.8
	Hassi Chergui	8,200						50.6
	Nezla N., 1965	8,530						51.5
	Rhourde El Baguel, 1962	9,850						40.2
	Mesdar E. & W., 1972	11,155						40.3
	El Gassi-El Agreb, 1959	10,170	NA	NA	NA	647,000	6,953,700,000	47.9
	Rhourde Nouss & E., 1972	8,530						39.7
	Tin Foye Tabankort, 1966	4,600- 6,560						41.1-41.3
	Djoua W., 1967	5,580- 6,240						41.1
	Amassak, 1970	6,565						41.1
	Tamendjelt, 1970	5,585- 6,890						41.1
	Timedratine, 1964	8,155						42.7
	Ohanet N. & S., 1960	7,878						43.8
	Askarene, 1962	8,200						41.7
	Guelta, 1962	8,960						41.7
	Stah, 1971	9,515						45.8
	Ras Toumb, 1976	9,190						35.7
	Haoud Berkaoui-Ben Kahla, 1965	11,000						43.6
	Guellala-Guellala N.E., 1969	11,320						42.2-42.3
	N'Goussa, 1974	11,715						42.2
	Kef El Argoub, 1973	12,570						42.2
	Oued Noumer, 1969	8,860						48.3
	Djorf, 1974	9,025						48.3
	Djebel Onk, 1960	3,940						37.0
	Alrar F,J,T	...						...
	Hassi R'Mel[c]	...						...
	Gassi Touil[c]	...						...
	Other Crude	...						...
	Condensate	...						...
	Total Algeria		**NA**	**NA**	**NA**	**647,000**	**6,953,700,000**	
ANGOLA FINA ANGOLA[e]	Ganda, 1975	5,010	2	...	...			36.1
	N'Z Kitona S & D, 1973	5,200- 5,670	5	...	1			30.4
	N'Z Pangala, 1973	4,997- 5,095	5	2	1			36.1
	N'Zombo, SW I, SW S, & SE S, 1973	5,245- 6,270	5	...	1			30.2-31.0
	Quenguela N., 1967	4,900- 6,200	1	21	18	36,235	211,433,200	31.1
	Quinfuquena I & S, 1975	6,800- 7,050	8	...	4			31.4-32.0

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	Quingula, 1972	4,100	3	8	1			36.2
	Bento, 1972	7,500	1	...	1			26.0
	Cabeca da Cobra, 1969	3,400	4	...	2			41.1
	Pambo, 1982	4,600	4	...	1			38.8
	Luango, 1977	3,800	3	...	...			38.0
	Other	3,400- 6,500	12	4	36			27.5-37.4
GULF CABINDA	• Enva, 1969	10,650	1	...	...	323	3,909,043	30.2
	• Kambala, 1971	11,100	2	3	...	8,328	10,995,803	32.8
	• Kungulo, 1976	3,900	10	7	...	15,296	32,123,942	32.2
	• Limba, 1969	2,900- 8,750	4	7	3	16,353	74,517,206	31.6
	• Livuite, 1979	8,200	5	1	1	1,422	1,874,293	31.7
	• Malongo N., 1966	1,500- 8,500	5	54	10	15,805	197,703,787	29.6
	• Malongo S., 1966	1,300- 1,600	2	26	4	9,102	64,747,082	25.1
	• Malongo W., 1969	1,800- 6,900	5	14	16	10,985	214,387,587	22.5
	• Takula, 1982	4,000- 6,350	41	5	3	84,905	56,251,491	31.5
TEXACO	• Cuntala, 1978	7,000- 7,500	...	1	...	100	2,020,000	34.0
	• Essungo, 1975	6,500- 6,750	10	...	...	7,500	14,124,000	37.0
ELF-MOBIL-AGIP-NAFTAGAS-INA NAFTAPLIN	Palanca, 1981	8,700	7	...	...	16,541	2,084,119	39.6
	Total Angola		**145**	**153**	**106**	**223,525**	**885,898,553**	
ARGENTINA	Chubut, 1907	1,968- 9,168	65	2,100	83	90,794	919,502,312	21.1-26.0
	Jujuy, 1969	2,461-16,732	9	...	1	1,500	59,779,080	46.5-47.0
	La Pampa, 1968	3,609- 4,921	4	182	1	7,987	67,280,749	31.0
	Mendoza, 1932	2,178-16,778	34	1,091	16	99,637	985,346,689	23.7-32.0
	Neuquen, 1918	1,312-12,498	174	759	42	65,811	425,616,125	24.0-41.0
	Rio Negro, 1960	2,953- 7,546	65	775	20	43,438	402,256,968	22.5-41.0
	Salta, 1928	6,551-15,092	36	12	8	11,001	109,320,149	39.0-59.0
	Santa Cruz, 1946	1,468-17,060	121	2,962	93	100,442	897,244,226	21.1-30.0
	Tierra del Fuego, 1959	5,249- 7,824	91	99	10	23,981	135,382,913	43.4-46.0
	Formosa, 1984	11,466-11,490	1	1	1	3,287	1,142,112	42.0-42.9
	Total Argentina		**600**	**7,981**	**275**	**447,878**	**4,002,870,323**	
AUSTRALIA	ESSO-BHP • Barracouta, 1968	4,550	...	2	...	4,421	29,512,281	62.8
	• Cobia, 1972	7,700	8	...	5	43,371	26,034,836	44.5
	• Halibut, 1967	7,700	11	...	8	83,215	622,714,266	43.3
	• Kingfish, 1967	7,500	7	20	15	69,574	890,881,236	46.3
	• Mackerel, 1969	7,700	10	6	2	106,588	262,518,093	45.6
	• Tuna, 1968	6,500	19	...	6	10,498	25,968,082	40.5
	• Snapper, 1968	4,350	5	12	1	4,453	6,629,877	47.0
	• Marlin, 1966	5,100	...	1	3	8,698	45,498,879	50.0
	• W. Kingfish, 1968	7,500	17	...	2	40,601	24,406,612	46.9
	• Fortescue, 1978	7,700	15	...	5	95,784	57,015,472	43.0
	• Flounder, 1968	8,200	6	...	...	6,926	1,262,834	46.7
	MOONIE Alton, 1964	6,000	...	5	2	37	1,864,821	50.5
	Bennett	5,960	1	...	...	5	111,014	45.0
	Cabawin, 1961	5,800	1	...	...	13	51,749	49.0
	Moonie, 1961	5,800	...	14	18	663	21,066,987	44.5
	Mereenie, 1964	3,983	13	...	15	1,761	506,000	50.0
	WAPET GROUP Barrow Island, 1964	1,200-6,700	6	373	NA	20,200	207,496,000	37.0
	HARTOGEN GROUP Borah Creek, 1982	4,860	...	...	2	11	8,265	38.0
	Kincora, 1980	4,850	5	2	5	165	243,885	34.0
	Sandy Creek, 1982	4,840	1	...	...	6	4,818	42.0
	Waratah, 1982	5,350	...	4	...	227	162,549	33.0
	Tintaburra, 1984	3,540	6	...	1	400	391,903	43.0
	SANTOS GROUP Tirrawarra, 1970	9,500	27	...	3	4,369	3,618,559	52.0
	Moorari, 1971	9,400	5	...	1	439	621,397	51.5
	Fly Lake, 1971	9,300	2	...	1	334	301,218	53.0
	Woolkina, 1982	9,700	1	...	...	123	33,435	51.5
	BOND Harriet, 1983	6,230	NA	NA	9	NA	NA	38.0
	STRATA Woodada,[c] 1980	7,500	5	...	1	6	1,010	54.0
	PACIFIC BASIN Mount Horner, 1980	5,800	...	1	2	10	4,500	37.0
	WOODSIDE North Rankin, 1972	9,800	6	...	...	519	94,714	48.0
	HOME EXERGY Blina, 1981	4,920	2	4	...	4,717	500,040	35.0
	Sundown, 1983	3,608	1	1	1	75	64,785	35.0
	West Terrace, 1985	3,937	1	...	...	...	2,516	35.0
	DELHI Jackson, 1981	4,750	13	24	...	13,200	6,111,000	40.2-48.0
	Jackson South, 1982	4,800	...	6	...	960	489,000	40.8
	Naccowlah South, 1983	6,000	2	4	...	2,120	512,000	40.0-46.1
	Naccowlah West, 1983	5,700	5	1	...	1,630	333,000	40.0-48.3
	Strzelecki, 1978	5,800	14	3	...	6,550	6,017,000	43.4-50.9
	Dullingari, 1979	5,200	13	10	2	3,450	3,144,000	53.5-54.3
	Merrimelia, 1981	6,100	7	2	...	1,650	1,186,000	42.0-49.0
	Gidgealpa, 1984	6,150	6	2	...	1,040	188,000	45.0-51.0
	Limestone Creek, 1984	5,100	2	2	1	340	62,000	41.2
	Wancoocha, 1984	6,000	4	...	1	670	121,000	54.3
	Total Australia		**246**	**500**	**112**	**538,819**	**2,247,755,633**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
AUSTRIA	MOBIL	Voitsdorf, 1963	7,000	3	25	10	609	21,099,133	36.0
		Sattledt, 1971	5,700	...	13	1	690	4,505,631	37.0
		Kemating, 1979	6,100	...	8	...	1,168	2,776,826	34.0
		Gaiselberg, 1938	5,200	...	33	31	692	31,429,223	25.0
		Other	...	2	67	39	2,244	24,351,506	33.0
	OEMV	Hochlerten, 1977	3,100- 5,000	7	35	...	235	1,418,000	21.3
		Matzen, 1949	6,100	81	864	...	12,313	425,892,000	25.7
		Pirawarth, 1957	1,600- 6,500	...	73	...	1,181	11,276,000	28.4
		St. Ulrich, 1938	1,600- 4,300	1	185	...	840	40,773,000	31.1
		Other	...	6	202	...	1,710	77,412,000	...
		Total Austria		**100**	**1,505**	**81**	**21,682**	**640,933,319**	
BAHRAIN	BANOCO	Awali, 1932	1,850- 4,600	158	113	36	41,850	750,000,000	33.0
		Total Bahrain		**158**	**113**	**36**	**41,850**	**750,000,000**	
BARBADOS	BARB. NOC	Woodbourne, 1966	6,500	18	55	37	1,864	3,119,000	30.5
		Total Barbados		**18**	**55**	**37**	**1,864**	**3,119,000**	
BENIN	SAGA	Seme, 1968	6,232	...	6	...	6,900	5,400,000	22.6
		Total Benin		**—**	**6**	**—**	**6,900**	**5,400,000**	
BOLIVIA	YPFB[9]	Camiri, 1927	3,936	13	70	...			55.0
		Carand, 1960	3,940	27	14	...			60.0
		Colpa, 1961	9,184	17	..	...			65.0
		Monteagudo, 1966	4,592	14	25	...			41.0
		La Pena, 1965	8,856	24	...	...	13,972	262,361,000	43.0
		Palmar, 1964	10,758	7	...	...			65.0
		Rio Grande, 1961	9,512	40	...	...			62.0
		Vuelta Grande, 1978	8,220	4	...	...			67.0
		Espino, 1979	14,655	2	...	...			56.2
		Other	...	15	50	...			...
	OCCIDENTAL	Tita, 1976	6,450	10	1	4	434	4,128,276	70.5
		Porvenir, 1978	9,600	6	...	...	4,344	7,210,317	69.5
	TESORO	La Vertiente, 1977	10,827	7	...	1	1,250	2,960,000	64.1
		Escondido, 1980	11,292	...	...	5	...	...	60.0
		Taiguati, 1981	10,174	...	...	1	...	...	63.0
		Los Suris, 1981	13,576	...	...	1	...	...	50.0
		Total Bolivia		**186**	**160**	**12**	**20,000**	**278,650,593**	
BRAZIL*	ALAGOAS	Furado, 1969	4,440- 5,500	11	33	...	2,430	11,673,870	35.0
		Pilar	NA	17	9	...	5,750	2,805,250	40.0
		Tabuleiro de Martins, 1957	NA	...	24	...	730	3,321,010	27.0
		Other	...	5	6	...	1,200	1,390,050	...
	BAHIA	Agua Grande, 1951	820- 4,265	24	102	...	6,560	268,524,140	40.0
		Aracas, 1965	3,280- 8,856	9	114	...	8,710	102,379,070	41.0
		Buracica, 1959	1,476- 1,840	..	197	...	7,620	129,010,080	35.0
		Faz. Imbe, 1964	2,130- 5,575	1	32	...	1,430	13,089,070	40.0
		Faz. Boa Esperanca, 1966	7,215- 8,036	...	12	...	900	14,510,570	39.0
		Faz. Panelas, 1962	NA	...	13	...	760	5,937,570	37.0
		Malombe, 1966	3,280	...	20	...	450	5,396,730	41.0
		Mata/Remanso, 1971	4,445- 4,560	13	46	...	2,600	17,378,720	35.0
		Miranga, 1965	3,280- 3,936	7	157	...	12,160	169,371,730	40.0
		Rio Dos Ovos, 1979	NA	...	11	...	320	1,597,610	35.0
		Santana, 1962	NA	..	...	...	170	5,327,460	37.0
		Sesmaria	NA	7	16	...	1,510	1,842,910	NA
		Candeias, 1941	3,280- 7,415	2	29	...	3,040	74,276,250	30.0
		Cassarongongo, 1959	1,475- 4,755	...	18	...	750	13,284,060	32.0
		Dom Joao Terra, 1947	NA	...	53	...	1,460	19,504,670	38.0
		Riacho da Barra, 1982	NA	5	27	...	6,910	5,289,720	39.0
		Taquipe, 1958	3,115- 3,935	4	57	...	4,570	80,226,400	40.0
		• Candeias Mar	NA	1	13	...	760	6,371,570	30.0
		• Dom Joao Mar, 1947	920	3	280	...	5,120	76,704,110	38.0
		• Ilheus, 1979	NA	...	...	...	...	893,150	41.0
		Cexis, 1983	...	9	...	...	1,900	1,176,190	30.0
		Faz. Balsamo, 1983	2,500- 4,000	8	4	...	1,760	698,170	31.0
		Rio Pojuca, 1982	5,600- 6,200	9	6	...	2,440	1,691,960	35.0
		Other	...	8	121	...	6,800	24,448,440	...
	CEARA	Faz. Belem, 1980	1,150- 2,500	...	95	...	2,130	1,484,390	13.0
		• Curima, 1978	6,888	10	...	...	7,470	11,309,060	32.0
		• Xareu, 1977	5,717- 5,766	20	2	...	8,700	8,510,100	39.0
		• Atum, 1983	...	7	...	...	4,430	2,949,920	25.0
		• Espada, 1983	...	5	...	...	1,310	1,622,770	26.0
	ESPIRITO SANTO	Faz. Cedro, 1962	5,248	...	10	...	940	8,761,690	28.0
		Sao Mateus, 1969	NA	...	44	...	1,740	2,559,950	27.0
		Lagoa Parda, 1977	5,576	11	30	...	6,610	16,542,170	30.0
		Rio Itaunas, 1977	NA	3	30	...	1,620	2,182,560	28.0

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	• Cacao, 1978	9,184	3	1	...	2,830	7,214,400	32.0
	Lagoa Suruaca, 1982	...	12	2	...	3,460	2,497,050	30.0
	Lagoa Piabanha, 1984	...	3	...	...	700	163,530	27.0
	Other	...	1	36	...	2,360	3,578,910	...
RIO DE JANEIRO	• Enchova, 1976	6,973- 7,885	10	...	...	35,560	42,927,890	23.0
	• Bonito, 1977	NA	10	...	...	11,410	17,888,190	27.0
	• Garoupa, 1974	11,382	...	14	...	24,090	41,820,880	30.0
	• Namorado, 1975	10,083	9	...	...	40,210	43,707,820	28.0
	• Garoupinha, 1974	12,693	3	...	...	4,800	6,780,400	30.0
	• Pampo, 1977	6,215	7	...	...	55,060	20,869,870	21.0
	• Area RJS-236, Trilha, 1983	NA	4	...	...	11,580	3,207,800	28.0
	• Linguado, 1981	NA	9	...	...	35,610	23,788,020	20.0
	• Badejo, 1981	NA	3	2	...	5,150	7,277,300	28.0
	• Bicudo, 1982	NA	5	...	...	14,550	20,548,780	22.0
	• Corvina, 1983	8,800- 9,000	4	...	...	13,630	9,830,960	27.0
	• Pirauna, 1982	8,900- 9,300	7	...	...	15,170	7,793,060	28.0
	• Sul de Pampo, 1978	9,300- 9,600	4	...	...	3,930	11,604,370	20.0
	• Cherne, 1982	9,900-10,200	9	...	...	31,740	10,516,550	27.0
	• Bagre, 1983	8,700- 9,000	1	...	...	1,170	654,140	25.0
	• Parati, 1982	8,900- 9,200	3	...	...	3,130	2,534,790	25.0
	• Viola, 1981	9,200- 9,900	4	...	...	5,890	1,069,270	26.0
	• Marimba, 1983	8,900- 9,200	1	...	...	1,220	220,140	28.0
	• Anequim	8,200- 8,500	3	...	...	2,930	528,340	27.0
RIO GRANDE DO NORTE	Alto do Rodrigues	990- 1,120	...	164	...	2,600	1,968,710	18.0
	• Ubarana, 1973	7,216- 8,365	35	21	...	16,150	30,838,890	40.0
	• Agulha, 1975	5,412	2	...	...	990	6,566,550	33.0
	Estreito/Rio Panon	650- 820	...	135	...	2,800	2,648,010	16.0
	Faz. Pocinho	1,450- 2,000	13	47	...	3,300	2,981,370	35.0
	Palmeiras	1,450- 1,800	...	27	...	1,410	937,180	25.0
	Serraria	3,200- 3,900	2	8	...	1,170	773,640	27.0
	Guamaré	1,400- 1,600	...	8	...	840	773,650	25.0
	Other	...	...	46	...	550	2,107,070	...
PARÁ	• Área 1-PAS-11, 1983	...	...	...	...	...	495,000	41.0
MARANHÃO	São João, 1983	4,950- 6,200	...	2	...	80	6,300	40.0
SERGIPE	Atalaia Sul	NA	...	...	...	630	2,484,470	NA
	Carmopolis, 1963	2,460	...	581	...	23,440	139,482,600	24.0
	Riachuelo, 1961	1,475	...	187	...	4,400	16,906,980	28.0
	Siririzinho, 1967	1,640	...	138	...	5,830	29,008,560	30.0
	• Caioba, 1969	6,232- 6,890	9	...	...	3,010	27,058,710	36.0
	• Camurim, 1970	6,232	10	12	...	3,780	11,371,960	25.0
	• Dourado, 1970	3,620- 3,635	4	...	...	510	3,258,120	36.0
	• Guaricema, 1968	3,335- 4,430	7	6	...	6,000	30,474,080	41.0
	• Robalo, 1973	...	3	...	...	130	647,850	30.0
	Other	...	1	66	...	1,260	3,534,870	...
*Total output by Petrobras, grouped by states.	**Total Brazil**		400	314	...	328,820	1,715,390,170	
BRUNEI SHELL	• Ampa SW, 1963	7,068- 8,155	82		125	20,335	478,181,144	41.0
	• Champion, 1970	4,300	190		60	50,621	245,096,532	23.0
	• Fairley, 1969	10,740	43		7	9,933	94,726,930	40.0
	• Fairley-Baram, 1973	9,500	...		3	...	12,361,594	40.0
	• Magpie, 1975	NA	18		3	17,910	49,079,701	31.0
	Seria, 1928	NA	375		166	27,338	950,551,996	34.0
	Jerudong, 1939	NA	...		2	...	636,814	39.0
	Rasau, 1929	NA	2		2	810	456,209	30.0
	Total Brunei		629		368	126,947	1,831,090,920	
BURMA[c] MYANMA	Chauk-Lanywa, 1902	1,500- 4,000						36.0
	Mann, 1970	1,600- 7,000						37.5
	Myanaung, 1964	2,000- 4,000	170	275	...	30,000	466,280,000	40.5
	Prome, 1965	850- 5,000						36.0
	Yenangyaung, 1902	100- 6,700						36.0
	Total Burma		170	275	...	30,000	466,280,000	
CAMEROON ELF[e]	• Betika, 1972	5,300						42.5
	Ekoundou S., 1975	6,200						24.0
	Kole, 1974	5,500						31.0
	Kombo Center, 1976	5,900						37.0
	Kombo North, 1978	7,200						35.0
	Ekoundou Horst plus Center, 1972	7,200						29.0
	Boa, 1976	5,900						35.0
	Bavo South, 1976	5,600						29.3
	Betika S. Marine, 1979	6,300	138	28	4	126,165	213,690,000	30.0
	Ekuondou N. Marine, 1977	5,250						36.0
	Mokoko NE plus Abana, 1977	4,600						29.0
	Asoma Marine, 1973	3,600						19.0
	Kita E. Marine, 1978	6,900						40.8
	Mokoko S. Marine, 1977	3,300						17.0
	Inova Marine, 1976	6,200						32.8
TOTAL-CFP	• Moudi, 1979	5,250- 5,900	5	2	3	5,780	5,540,000	40.0
	• Moudi D., 1980	3,300	...	...	...	1,055	221,640	21.3
	Total Cameroon		143	30	7	133,000	219,451,640	

		Name of field, discovery date	Depth, feet	No. of wells capable of prod.	B/d average, first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
CANADA	ALBERTA	Acheson, 1950	3,390	122	12,207	109,428,003	38.0
		Bantry, 1940	2,574- 3,300	176	5,187	40,854,578	...
		Bellshill Lake, 1955	2,950	333	11,700	46,496,375	...
		Bonnie Glen, 1952	3,959- 6,779	161	58,625	446,335,202	34.0-44.0
		Carson Creek N., 1958	8,787- 8,935	74	13,799	128,078,189	44.0
		Cessford, 1950	2,800- 3,028	239	3,344	26,807,023	...
		Clive, 1951	6,074- 6,208	158	6,106	43,960,997	...
		Countess, 1951	2,858- 4,272	142	8,513	54,660,883	...
		Fenn-Big Valley, 1950	3,900- 5,400	336	40,196	289,353,420	32.0
		Gilby, 1962	4,201- 7,000	137	3,550	43,280,505	...
		Golden Spike, 1949	3,570- 5,961	79	1,936	179,132,150	36.0
		Harmattan, E.	8,040- 8,558	157	6,655	66,145,044	...
		Harmattan-Elkton, 1955	8,796-10,757	68	5,652	55,728,981	...
		Innisfail, 1956	6,730- 8,440	80	5,697	68,683,286	...
		Joarcam, 1949	3,179	267	5,976	95,313,051	...
		Joffre, 1953	4,983- 6,779	162	3,257	78,733,094	...
		Judy Creek, 1951	8,307- 8,701	272	15,931	371,112,655	43.0
		Kaybob, 1957	4,870- 9,577	86	6,893	94,939,079	...
		Kaybob S., 1958	5,600-10,042	99	11,478	66,215,065	...
		Leduc-Woodbend, 1947	3,062- 5,380	741	5,856	370,596,847	40.0
		Lloydminster, 1933	1,690- 1,945	799	6,609	41,347,983	...
		Medicine River, 1954	5,435- 7,600	315	10,109	57,933,881	...
		Mitsue, 1964	5,908	303	27,765	248,802,542	43.0
		Nipisi, 1965	5,648- 5,726	296	37,468	233,566,031	41.0
		Pembina, 1953	3,000- 6,133	3,762	88,019	1,120,750,544	32.0-37.0
		Provost, 1946	2,760- 2,898	935	8,750	52,429,060	...
		Rainbow, 1965	4,994- 6,160	249	49,263	450,893,223	38.0-42.0
		Rainbow S., 1965	6,102- 6,400	56	7,257	56,120,093	...
		Red Earth, 1956	4,184- 4,878	212	4,603	31,263,596	...
		Redwater, 1948	2,012- 3,200	846	20,044	769,187,679	35.0
		Simonette, 1958	10,500	35	2,019	35,310,308	...
		Snipe Lake, 1962	8,500	98	3,256	49,258,354	...
		Sturgeon Lake S., 1953	4,912- 8,471	145	11,838	123,456,592	37.0
		Sundre, 1954	8,700- 9,000	60	2,730	33,001,183	...
		Swan Hills, 1957	8,100	783	44,992	627,878,717	40.0
		Swan Hills S., 1959	8,400	205	22,128	320,368,555	...
		Turner Valley, 1913	3,100- 9,150	160	2,936	136,434,095	39.0
		Utikuma Lake, 1963	5,624	129	10,510	35,695,658	...
		Virginia Hills, 1957	9,210	166	13,716	128,841,514	34.0
		Wainwright, 1925	1,903- 2,200	692	8,684	56,610,528	...
		Westerose, 1952	6,818	29	21,479	112,627,896	...
		Willisden Green, 1956	5,157	752	10,669	104,944,730	...
		Wizard Lake, 1951	4,044- 5,973	44	31,745	300,795,337	...
		Zama	3,702	227	7,147	68,297,552	33.0-37.0
		Other	...	11,065	307,456	1,212,509,378	...
	BRITISH COLUMBIA	Boundary Lake, 1957	3,418- 4,575	354	11,646	157,544,308	40.0
		Other	...	452	22,281	229,851,488	...
	MANITOBA	All fields	...	1,393	14,020	148,561,645	...
	SASKATCHEWAN	Steelman, 1950	4,600	661	9,726	243,565,414	27.0
		Weyburn, 1955	4,600	702	11,897	267,663,583	28.0
		Other	...	13,556	159,967	1,479,512,737	...
	ONTARIO	All fields	...	...	1,800	58,994,985	...
	NEW BRUNSWICK	All fields	...	...	...	798,578	...
	NORTHWEST TERRITORIES	All fields	...	110	13,052	29,938,575	...
		Total Canada		**43,480**	**1,238,139**	**11,720,700,679**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
CHILE[e]	ENAP-MAINLAND	Canadon, 1962	6,090						38.4
		Daniel, 1960	5,806						25.4
		Daniel Este, 1961	5,523	96	8	238	5,390	147,120,000	25.0
		Dungenes, 1962	5,251						28.6
		Posesion, 1960	5,622						63.6
	TIERRA DEL FUEGO	Calafate, 1955	6,045						49.3
		Catalina Sur, 1961	5,779	55	21	211	6,470	119,240,000	44.0
		Cullen, 1954	5,730						41.8
		Tres Lago, 1957	5,724						40.1
	STRAIT OF MAGELLAN	• Ostion, 1977	7,156						33.0
		• Posesion, 1977	6,727	34	52	18	22,140	56,400,000	34.5
		• Spiteful, 1977	6,298						34.5
		• Spiteful Norte, 1978	7,150						39.0
		Total Chile		**185**	**81**	**467**	**34,000**	**322,760,000**	
CHINA, TAIWAN	CHINESE PETROLEUM	Tiechengshan, 1959	...	29	...	4	1,271	14,092,051	51.0
		Chingtsohu, 1967	...	8	...	4	139	...	50.0
		Yunghoshan, 1971	...	6	...	1	323	5,732,188	45.0
		Other	...	41	...	12	336	...	50.0
		Total China, Taiwan		**84**	**...**	**21**	**2,069**	**19,824,239**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
COLOMBIA	ECOPETROL	Galán, 1945	3,200	...	71	13	1,408	20,468,000	19.0
		Infantas, 1918	3,200	...	308	180	2,287	221,850,000	25.8
		La Cira, 1925	3,250	...	690	86	8,917	455,202,000	24.0
		[illegible]-Nutria, 1957	9,500	26	120	...	7,127	28,754,000	31.0
		[illegible]o, 1960	7,300	...	55	...	3,861	17,494,000	21.0
		[illegible]es-Tesoro, 1977	4,400- 8,000	...	18	...	790	1,284,000	36.4
		[illegible]uete, 1961	8,000	...	12	9	629	16,800,000	43.0
		[illegible]rto Barco, 1958	7,000	2	...	2	1,026	84,203,000	47.9
		Cantagallo, 1941	6,800	...	22	...	690	17,686,000	19.7
		Casabe, 1941	3,800	...	287	...	3,260	217,082,000	20.7
		Yarigui, 1954	8,700	...	59	...	7,834	104,130,000	19.5
		Churuyaco, 1968	8,900	...	4	...	1,251	2,622,000	31.8
		Orito, 1963	6,600	...	16	...	3,100	42,968,000	39.7
		Acae	..	...	5	...	2,995	8,359,000	32.0
		Sucumbios	...	...	2	..	531	838,000	44.0
		Apiay, 1981	10,500	6	...	...	6,386	4,685,000	23.0
		Other	...	36	147	21	4,019	544,692,000	...
	CHEVRON	Castilla, 1969	6,500	...	14	1	9,290	10,756,000	13.5
		Rio Zulia, 1961	5,700	..	19	5	2,594	128,843,000	41.0
	TEXACO	Velasquez, 1946	7,500	...	134	7	4,726	160,638,000	19.0-24.0
		Palagua, 1954	5,000	...	116	10	4,718	80,720,000	14.0-17.0
		Cocorná, 1963	2,100	..	51	2	3,833	10,480,800	12.0-13.0
		Tisquirama, 1963	8,000	...	3	2	425	5,0004,000	16.0-28.0
		Teca, 1981	2,100	...	102	22	12,096	6,798,896	12.0-13.0
		Other	...	...	5	10	247	4,174,000	12.0-16.8
	INTERCOL	Arauca, 1980	18,000	...	2	2	2,413	2,910,000	41.0
		Bonanza, 1963	4,000	...	15	...	870	11,910,000	30.0
		La Tirga, 1921	...	...	...	...	...	34,000	...
		Provincia, 1962	8,000	..	64	...	13,430	142,619,000	33.0
	TENNECO	Dina K, 1969	6,500	..	22	...	5,709	20,197,354	22.5
		Dina Tertiary, 1961	3,600	2	35	4	5,872	15,069,794	20.1
		Palogrande, 1971	6,000		36	1	6,160	10,312,361	20.0
		Cebu, 1981	...		...	...	1,002	2,764,186	...
		Brisas, 1973	4,200		4	...	1,592	3,782,321	23.3
		Pijao, 1981	5,500		7	...	1,420	2,737,563	21.0
		Hato Nuevo, 1984	7,000	...	4	1	1,654	733,102	36.2
		Tello, 1971	7,000	...	31	1	13,174	30,938,654	22.0
		La Canada, 1966	600	5	...	...	155	930,853	22.5
		San Francisco, 1985	3,000	..	5	...	6,131	190,000	26.0
	ELF	Trinidad, 1974	9,600	1	1	...	1,420	1,037,000	33.0
		Caño Garza, 1983	8,500	2	1	...	1,443	1,090,000	34.0
		Barquerena, 1982	10,300	1	1	...	1,212	740,000	37.0
		Tocaria, 1980	13,000	2	...	...	85	55,000	35.0
		Cravo Sur, 1982	10,300	1	..	...	1,096	389,000	38.0
		La Gloria Norte, 1983	12,900	1	...	...	407	91,000	18.0
	PETROCOL	Adalucía Sur, 1980	1,700	...	17	5	1,265	2,837,000	33.0
	ARGOSY	Burdine, 1974	11,000	...	2	1	160	2,463,000	24.1
		Nancy, 1974	11,000	...	1	...	381	1,591,000	25.5
		Maxine, 1976	11,000	...	...	1	...	109,000	26.3
	OCCIDENTAL	Payoa, 1962	8,000	17	33	6	1,680	68,249,000	27.9
		Salina, 1936	2,500	2	64	7	3,320	9,361,000	28.0
		Other	...	...	...	19	...	5,303,000	...
		Total Colombia		**104**	**2,605**	**417**	**166,091**	**2,534,975,884**	
CONGO	AGIP	• Loango, 1972	3,000	4	31	2	18,085	60,382,476	26.8
	ELF CONGO	• Emeraude, 1969	820	...	113	...	19,782	141,327,066	21.8
		• Likouala, 1979	4,270	28	...	...	19,023	34,694,347	33.1
		• Yanga, 1979	2,950	47	...	...	29,824	40,681,580	29.4
		• Sendji, 1973	3,940	41	...	...	27,681	15,554,173	30.1
		Pointe Indienne, 1951	5,000	...	3	...	190	6,767,890	36.9
		Mengo, 1979	6,500	...	3	...	300	408,770	34.0
		Kundsi, 1980	4,000	...	2	...	185	276,285	35.8
		Total Congo		**120**	**152**	**2**	**115,070**	**300,092,587**	
DENMARK	DUC	• Dan, 1971	6,000- 6,400	...	..	...	7,530	26,407,034	30.4
		• Gorm, 1971	6,500- 7,000	...	...	...	30,770	41,042,082	34.0
		• Skjold, 1977	5,000	...	...	...	14,105	9,323,145	29.2
		Total Denmark		...	...	...	**52,405**	**76,772,261**	
DUBAI[e]	DUPETCO	• Fateh, 1966	7,900- 9,000	102	39	15	322,200	1,593,548,000	31.8
		• S.W. Fateh, 1970	7,500- 9,000						30.3
		• Falah, 1972	8,100						25.5
		• Rashid, 1973	9,400-11,500						38.0
	ARCO[c]	Margham, 1981	10,500	11	...	1	25,800	5,850,000	43.5
		Total Dubai		**113**	**39**	**16**	**348,000**	**1,599,398,000**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
ECUADOR	CEPE	Ancon, 1921	4,000	23	537	2,457	1,248	112,089,980	35.6
		Shuara, 1980	9,100	6	...	...	7,793	7,042,284	29.6
		Secoya, 1980	9,100	6	...	1	9,848	8,581,929	30.3
		Shushuqui, 1980	9,200	4	...	2	5,442	6,699,585	28.8
		Charapa, 1967	10,000	...	1	2	371	289,125	30.0
		Pichincha, 1983	9,000	1	...	...	1,236	777,626	NA
		Cuyabeno, 1972	8,050	8	...	1	5,140	2,277,558	28.8
		Sansahuari, 1979	8,100	2	...	2	1,357	615,517	28.8
		Bermejo, 1967	5,000	5	...	...	1,944	503,321	34.0
		Tetete, 1980	9,300	2	...	2	1,757	673,156	28.0
	TEXACO	Aguarico, 1968	9,850	...	4	6	8,367	37,543,347	27.2
		Atacapi, 1968	9,855	2	2	1	2,936	10,091,735	31.0
		Auca, 1970/Auca Sur, 1980	10,578	...	19	3	17,800	52,651,340	28.0
		Lago Agrio, 1967	10,175	6	19	9	11,874	101,186,768	28.5
		Parahuacu, 1968	10,173	1	4	...	1,645	5,409,787	30.0
		Sacha, 1969	10,160	18	65	19	60,568	201,077,444	28.0
		Shushufindi, 1959	9,772	...	44	16	101,816	410,513,941	30.0
		Yuca, 1970/Yuca Sur, 1979	10,423	...	7	1	4,204	8,002,570	28.0
		Culebra, 1973	10,626	...	1	...	897	1,163,995	17.5
		Yulebra, 1980	10,345	...	2	...	866	1,064,334	21.4
		Cononaco, 1972	11,233	8	2	...	19,162	7,265,295	33.3
		Rumiyacu, 1982	10,710	...	1	...	185	178,767	32.0
		Dureno, 1969	10,290	...	1	...	602	194,176	31.0
	CITY ECUATORIANA	Mariann, 1971	7,700	1	4	...	1,074	2,738,949	20.0
		Fanny, 1972	7,700	2	6	...	2,748	6,395,526	22.5
		Tarapoa, 1973	8,300	...	2	...	269	660,900	20.0
		Joan, 1974	7,500	...	...	2	...	5,479	18.0
		Total Ecuador		**95**	**721**	**2,524**	**271,149**	**1,075,894,452**	
EGYPT		Abu Gharadig, 1972	9,500	5	11	5	10,501	29,452,952	36.0
		• El Morgan, 1965	5,100- 6,400	...	79	22	169,121	896,220,057	27.0-32.0
		• Sidki (382), 1977	10,500	4	...	1	9,698	31,495,101	33.9
		• July, 1973	8,100-10,000	5	22	3	74,322	383,900,526	31.0-34.6
		• Ramadan, 1974	11,300	3	14	4	64,268	318,478,712	31.7
		Razzak, 1972; & East Razzak	7,700	2	10	2	3,605	47,768,062	36.0
		• SG-300, 1976	5,876	...	2	...	3,338	13,958,414	24.8
		• Shoab Ali, 1978	5,500	1	20	6	22,743	61,465,423	30.0
		• October, 1978	11,000	14	...	10	105,892	189,344,166	28.0
		• WD 33, 1972	9,800-10,800	...	2	...	216	2,035,341	32.0
		• SB 305, 1981	8,100	...	1	...	527	1,462,174	30.0
		• Badri (315), 1981	6,400	1	11	1	26,516	14,828,909	27.0
		• Younis (347), 1981	4,300	...	5	...	6,398	7,038,680	32.0
		• GH 376, 1981	8,600	...	3	2	3,242	3,203,795	25.0
		• GS 365, 1980	10,140	1	...	...	646	454,458	32.0
		• Hilal (404), 1982	9,200-10,000	4	...	...	33,735	8,374,329	32.0
		• Nessim (336), 1981	6,700	...	2	1	6,723	6,861,531	26.9
		• GS 277, 1980	8,610	1	...	...	2,530	879,899	34.0
		• SB 339, 1981	4,575	1	...	...	754	138,999	29.5
		• Waly (356), 1982	6,900	1	...	2	6,199	2,095,238	35.0
		• GS 345/346, 1982	7,460	2	...	1	2,707	731,606	38.0
	AGIP	Belayim, 1954	7,000- 8,500	2	94	13	41,630	387,736,000	22.5
		• Belayim, 1961	8,500	....	41	19	119,340	444,079,000	29.5
	PHILLIPS GROUP	El Alamein, 1966	8,700	3	9	5	2,487	64,353,098	33.6
		Umbarka, 1976	10,700	4	...	...	1,713	3,494,314	43.9
		Yidma, 1971	9,000	4	...	1	2,432	20,553,432	44.0
	EGPC[a]	Amer, 1965	3,500	1	22	10			21.5
		Asl, 1947	3,000	3	...	2			21.6
		Bakr, 1958	3,200	1	45	35			19.0
		El Ayoun, 1968	3,300	...	5	7			24.0
		Um El Yusr	...	3	16	20			21.5
		Gharib, 1938	2,200- 4,500	...	90	120			25.5
		Sudr, 1946	2,600	1	14	5	60,000	502,600,000	21.6
		Kareem	2,215- 2,310	...	8	27			16.6
		Shukheir	2,400- 2,500	5	...	4			34.0
		Kheir	1,037	...	1	3			30.0
		Matarma	3,026	1	1	...			17.6
		West Bakr	1,200- 1,500	...	20	2			18.0
		Elkhalig	1,580	1	...	...			29.4
		Ras Elbehar	...	4	...	4			32.5
	CFP	Ras Shukheir, 1980	6,200- 6,300	1	...	...	650	1,463,000	34.5
		• South Remadan	10,000	1	...	...	600	...	36.5
	SUCO[a]	• Ras Budran, 1978	11,400	7	...	...			26.0
		• LL 87-2, 1975	11,000	1	...	...	83,547	41,588,000	35.0
		Ras Fanar, 1978	2,300	6	...	...			35.0
		Zeit Bay, 1981	4,200	12	...	2			33.0
	BADR PETROLEUM (SHELL)	Badr el Din, 1982	...	4	...	...	9,920	5,526,095	38.0
		Total Egypt		**110**	**948**	**338**	**676,000**	**3,491,581,311**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
FRANCE	ALSACE	All fields	...	...	33	8	706	2,594,863	...
		Abandoned	...	...	...	...	...	24,265,065	...
	AQUITAINE BASIN	Lacq Superieur, 1949	2,170	9	32	15	924	24,672,840	22.3
		Parentis, 1954	7,710	2	63	8	6,770	190,334,840	33.4
		Lugos, 1956	5,250	...	23	2	916	9,203,188	20.8
		Cazaux, 1959	7,550	2	38	2	5,049	63,379,556	34.2-37.3
		Lavergne, 1962	11,480	...	4	...	342	11,778,598	41.7
		Montastruc, 1973	5,200	...	6	1	288	4,885,814	32.8
		Pecorade, 1974	10,660	8	1	4	2,242	6,652,851	29.3
		Castéra-Lou, 1976	9,600	...	9	...	850	1,780,592	21.7
		Vic Bilh, 1979	7,100	7	16	8	7,058	9,187,400	26.6
		Lagrave, 1984	6,500	1	...	2	2,913	599,400	42.5
		Other	...	...	18	2	416	13,702,431	...
		Abandoned	...	...	...	...	...	70,857	...
	PARIS BASIN	Coulommes, 1958	6,230	...	30	18	473	12,820,320	32.6
		Châteaurenard, 1958	1,800	...	24	12	442	4,385,837	27.5
		Saint-Martin, 1959	4,590	...	12	3	375	8,042,532	33.0
		Villeperdue, 1959	6,100	...	23	22	3,299	1,060,280	34.4
		Saint-Firmin, 1960	1,800	...	37	19	638	9,255,364	27.5
		Chuelles, 1961	1,800	...	44	15	642	6,365,593	27.5
		Courtenay, 1964	2,000	...	31	11	281	2,296,630	27.5
		Soudron, 1976	4,600	...	23	2	656	1,472,200	34.4
		Donnemarie, 1979	8,040	...	3	...	867	1,057,833	36.2
		Chailly	5,580	...	23	9	271	9,072,507	35.4
		Chaunoy, 1983	7,350	...	19	5	8,091	3,697,690	37.1
		Blandy, 1984	7,400	...	1	1	941	195,846	36.0
		St. Germain, 1984	7,200	...	1	...	516	98,520	36.0
		Other	...	7	51	19	1,269	22,409,596	...
		Abandoned	...	...	...	...	...	236,220	...
	SOUTHEAST + JURA	All fields abandoned	...	...	...	...	...	223,063	...
		Total France		**36**	**565**	**118**	**47,610**	**453,671,138**	
GABON	ELF[e]	• Anguille, 1962	9,200						31.2
		• Anguille NE, 1968	7,500						32.0
		• Anguille NNE, 1971	7,500						32.0
		• Barbier, 1972	6,000						29.5
		• Breme, 1976	5,000						36.5
		Clairette, 1956	4,400						29.0
		• Girelle, 1973	9,400						32.0
		• Gonelle, 1972	5,800						24.2
		• Grondin, 1971	7,500						16.4
		• Mandaros, 1972	4,900						19.8
		Olende, 1976	6,700						33.8
		• P.G.S. Marine, 1975	7,500	202	12	116	99,901	803,657,000	32.5
		• Port Gentil Ocean, 1964	6,500						33.0
		Tchengue, 1957	4,100						26.8
		• Torpille, 1968	8,200						35.8
		• Baliste, 1974	4,900						28.3
		• M'Bya Sud, 1969	6,700						35.4
		• Anguille SE, 1962	8,200						32.8
		• Ayol Marine, 1979	7,700						22.8
		• Baudroie N., 1980	7,500						34.5
		• Baudroie Marine, 1968	7,500						33.3
		Other	...						...
	SHELL/GULF/ELF	• Lucina-Marine, 1971	5,900		15	1	12,897	38,594,872	37.0
	SHELL/ELF	Gamba, 1963	3,000		31	9	8,003	146,523,427	32.4
		Ivinga, 1967	3,100		22	6	7,293	96,054,774	32.5
	AMOCO	Oguendjo B and C, 1981	5,000- 6,000	8	7	...	21,906	12,972,864	35.0
		Total Gabon			**297**	**132**	**150,000**	**1,087,802,937**	
GHANA[e]	AGIP-PETCO	• Saltpond, 1977	8,500	3	...	3	2,000	3,519,000	36.0-39.0
		Total Ghana		**3**	**...**	**3**	**2,000**	**3,519,000**	
GREECE	AEGEAN PET. CO.	• Prinos, 1974	8,000- 8,800	15	...	...	26,353	31,813,262	30.6
		Total Greece		**15**	**—**	**—**	**26,353**	**31,813,262**	
GUATEMALA*		Rubelsanto, 1974	5,300- 7,000	...	4	...			26.0-30.0
		West Chinaja, 1977	3,200- 3,800	3	...	...			35.0-43.0
		Caribe, 1981	6,930- 7,280	NA	1	...	3,090	11,186,000	22.0-24.0
		Tortugas	2,300	...	...	2			35.0
		Tierra Blanca	11,230	...	...	1			19.5
		Total Guatemala		**3**	**5**	**3**	**3,090**	**11,186,000**	

*New operator

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
INDIA[c]	GUJARAT STATE	Ankleshwar, 1960	2,953- 3,937						
		Bakrol, 1968	4,593- 4,921						
		Kadi, N., 1968	2,953- 3,909						
		Kadi, S., 1968	5,906- 6,562						
		Kalol, 1961	4,265- 5,250						
		Kathana, 1965	5,250- 5,906						
		Kholka, 1966	4,265- 5,577						
		Kosamba, 1963	1,968- 2,625		2,201	711	614,000	1,761,710,000	14.0-45.0
		Nawagam, 1563	4,429- 6,652						
		Sanand, 1963	4,265- 4,593						
		Sobhasen, 1968	4,429- 5,906						
		Wavel, 1963	4,265- 4,593						
	ASSAM STATE	Digboi, 1890	300- 7,500						
		Geleki, 1968	12,632-12,795						
		Lakwa, 1965	8,038-12,795						
		Moran, 1958	11,000						
		Nahorkatiya, 1953	9,500						
		Rudrasagar, 1961	10,171-10,500						
	MAHARASHTRA STATE	• Bombay High, 1974	4,530- 4,630						
		Total India			2,201	712	614,000	1,761,710,000	
INDONESIA	PERTAMINA UEP I[e]	Besitang, 1977	3,973						51.5
		Gebang, 1977	2,917						54.0
		K. Simpang, 1971	3,740- 5,019						45.0
		P. Tabuhan, 1937	3,350- 5,893	73	148	32			50.8
		Rantau, 1929	2,764						45.3
		Serang Jaya, 1926	3,701						47.5
		Other	—						—
	PERTAMINA UEP II[e]	Benuang, 1942	6,103						35.1
		Bel[illegible] East, 1973	NA						NA
		Ten[illegible], 1931	1,647						23.0
		Gr[illegible]mala, 1938	5,448						38.0
		Limau, 1928	3,896- 4,626						NA
		Ogan Timur, 1943	3,793						27.42
		Talang Jimar, 1937	4,123	70	342	1,007			31.0
		T. Miring, 1935	640						NA
		Tanjung Tiga, 1938	3,750						28.0
		Kenali Asam, [illegible]	2,077						25.0
		Belimbing	5,371						—
		Kuang, 1940	5,249						25.1
		Other	—						—
	PERTAMINA UEP III[e]	Camara, 1974	3,964- 7,104						—
		Jatibarang, 1969	3,063	33	55	96	51,093	2,053,540,800	29.0
		Tugu Barat, 1979	3,014						—
		Other	—						—
	PERTAMINA UEP IV[e]	Bunyu, 1923	2,077						33.2
		Sangatta, 1939	1,842						33.0
		Tanjung, 1938	2,296	32	129	173			39.9
		Tarakan Timur, 1967	4,396						38.8
		Wurukin S., 1966	2,067						26.9
		Other	—						—
	PERTAMINA UEP V[e]	Ka[illegible]ronc, 1936	574						19.0
		Linda, 1977	3,281	—	47	8			19.0
		Sele, 1951	2,156						35.0
	PERTAMINA (from Stanvac)	Sago, 1940	1,800						34.0
		Lirik, 1939	1,600						34.0
		Melmi, 1956	2,600						34.0
		N. Pulai, 1941	1,800						34.0
		S. Pulai, 1941	1,800	NA	NA	NA			34.0
		Talang Akar, 1922	2,800						35.0
		Benakat, 1932	1,600						35.0
		Jirak, 1930	2,300						35.0
		Rayan, 1940	6,000						38.0
		Abab, 1951	6,000						36.0
	CALTEX	Aman, 1974	4,700	—	10	—	1,308		36.1
		Anatara, 1978	1,425	—	5	—	643		35.8
		Balam SE., 1972	4,500	—	13	—	777		23.2-30.6
		Balam S., 1969	1,600	—	48	—	9,657		33.3
		Bangko, 1970	1,950	—	66	1	18,876		34.1
		Batang CPI & CT, 1975	690	—	11	—	817		20.8
		Bekasap, 1955	2,950	—	53	1	9,074		33.5-34.1
		Bekasap S., 1968	3,900	—	10	1	1,014		34.0
		Benar, 1973	2,450	—	25	—	3,762		33.2
		Intan, 1977	3,350	—	6	—	812		32.8
		Jorang, 1972	5,500	—	15	—	8,384		37.9
		Kerang, 1977	3,900	—	11	—	1,580		36.7
		Kopor, 1974	5,300	—	15	3	849		37.5
		Kotabatak, 1952	5,500	—	64	—	11,733		28.7

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	Bid average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	Lirik, 1968	6,000	7	1	—	1,322		34.6-42.2
	Lincak, 1981	2,570	—	4	—	1,104	5,524,688,800	33.0
	Menggala N., 1968	3,850	—	14	—	4,843		32.5-33.5
	Menggala S. CPI & CT, 1968	3,765	—	8	1	4,045		32.5-33.5
	Minas, 1944	2,600	—	393	4	194,782		35.0
	Pager, 1974	4,300	—	23	—	6,529		36.8
	Pelita, 1977	6,600	1	4	—	782		37.5
	Pematang, 1959	3,750	4	37	—	5,418		31.7-35.0
	Pematang Bow, 1969	5,300	—	7	—	380		31.7-35.0
	Pemburu, 1981	2,300	—	7	—	4,782		35.2
	Petani, 1964	4,750	2	30	1	8,147		32.8
	Petapahan, 1971	4,500	—	20	—	7,120		28.1
	Pinang, 1971	3,950	—	19	—	1,437		30.3
	Pudu, 1972	5,950	—	12	—	954		35.7
	Puncak, 1979	7,400	—	10	1	5,402		32.0
	Pungut, 1951	3,400	—	25	2	1,803		37.7
	Seruni, 1972	3,000	—	22	—	5,898		34.8
	Sikladi, 1975	4,340	—	18	—	1,540		39.0
	Sintong, 1971	3,400	—	19	—	4,303		32.0
	Tandun, 1969	3,000	—	9	—	707		33.7
	Telinga, 1975	4,205	—	9	1	940		35.3
	Topaz, 1977	5,200	—	7	—	2,292		32.7
	Ubi, 1976	4,350	—	20	—	1,913		34.7
	Wadux, 1975	6,100	—	10	—	2,128		37.7
	Duri, 1941	770	—	916	72	39,928		21.2
	Kulin, 1970	2,050	—	51	4	2,781		20.4
	Libo SE, 1973	5,900	18	4	1	9,542		34.6-42.2
	Other		—	67	9	2,358		—
CAL ASIATIC TOPCO	Beruk, 1974	1,750	19	19	—	6,796	32,876,390	38.0
	Beruk NE, 1976	1,800	3	3	1	294	1,407,845	39.8
	Bungsu, 1976	2,050	7	7	—	3,738	8,404,694	38.2
	Kasikan, 1972	660	18	18	1	936	4,917,728	27.7
	Pedada, 1973	950	18	18	1	11,409	53,745,648	31.3
	Sabak, 1974	2,350	13	13	1	1,566	15,612,785	35.7
	Zamrud, 1975	3,600	31	31	1	21,112	35,078,273	40.2
	Langgak, 1976	1,350	18	18	1	1,522	2,793,272	31.9
	Linda, 1971	1,100	14	14	2	911	5,056,057	30.9
	Tanjungmedan, 1976	2,770	—	2	—	726	—	29.0
	Benua, 1978	2,400	—	14	—	11,037	—	41.5
	Damar, 1974	4,650	—	4	1	702	—	34.8
	Dusun, 1979	2,550	—	5	—	3,642	—	42.3
	Pusaka, 1977	2,250	—	17	—	7,076	—	37.2
	Other		—	11	—	779	—	—
STANVAC (Central Sumatra)	Binio, 1972	1,600	—	22	7	809	11,175,449	34.0
	Pekan, 1976	3,700	—	23	22	1,116	6,685,754	35.0
	Merbau, 1979	2,700	2	21	12	1,382	4,878,470	36.0
	Kerumutan, 1980	3,000	—	25	9	2,208	3,710,362	35.0
	N. Merbau, 1980	2,600	—	9	8	961	2,243,970	36.0
	Penduk, 1981	2,500	—	8	2	450	1,137,716	46.0
	Kayuara, 1982	3,700	—	10	5	764	1,215,563	35.0
	Other	4,600	—	—	1	—	9,175	—
	Gemuruh, 1983	2,800	—	10	1	1,223	359,765	34.0
	E. Kayuara, 1983	3,500	—	16	—	2,039	539,011	35.0
	Mutiara, 1985	2,700	—	1	—	140	5,155	34.0
STANVAC (South Sumatra)	Ibul, 1970	5,700	2	17	25	1,879	20,611,932	36.0
	Rambutan, 1972	4,500	5	3	15	214	3,105,885	42.0
	Other	4,500	3	—	8	138	722,666	—
ARCO (Java Sea)	• Ardjuna, 1969	2,380- 7,250	136	119	38	160,891	521,642,200	37.0
	• Arimbi, 1972	2,943	—	11	1	2,573	20,253,400	33.0
PERTAMINA (N.E. Kalimantan)*	Sembakung, 1976	2,600	11	6	2	8,012	13,561,900	36.0
	Bangkudulis, 1980	3,250	—	—	1	—	85,000	39.5
PHILLIPS GROUP	Soloweit,* 1976	9,749	—	7	6	—	26,234,700	39.2
ROY M. HUFFINGTON INC.	Badak, 1972	9,190-10,600	22	13	9	6,258	32,822,965	32.0
	Nilam, 1974	7,500-11,510	32	9	3	8,221	12,442,628	32.0
	Pamaguan, 1974	900- 5,100	6	9	10	2,599	3,873,090	30.0
	Mutiara	900- 5,770	6	1	10	2,218	594,602	30.0
	Badak,[e] 1972	3,500-15,600	51	—	31	8,238	33,400,000	42.0
	Nilam,[e] 1974	7,400-13,400	54	—	23	8,527	4,800,000	42.0
	Other		10	—	34	—	606,451	—
TOTAL (NPC)[f]	• Bekapai, 1972	4,600- 5,600	34	—	13	19,334	137,100,000	40.0
	• Handil, 1974	3,000- 9,000	150	2	12	127,067	901,200,000	31.0
	• Nilam, 1976	8,000- 9,000	—	—	—	6,742	11,880,000	53.0
	• Tambora, 1984	8,500-11,500	—	—	—	3,580	657,000	53.0
UNION OIL	• Attaka, 1970	7,500	27	30	12	43,239	389,787,036	39.0
	• Melahin, 1972	7,500	3	3	—	907	5,442,216	23.4
	• Kerindingan, 1972	7,000	2	3	3	645	4,807,484	26.2
	• Sepinggan, 1973	11,150	7	8	2	7,319	35,833,550	32.5
	• Yakin, 1976	5,100	2	18	—	9,916	8,851,683	19.0
	• Rapak, 1981	5,500	3	—	—	4,130	1,747,740	33.0
AARBO[g]	Bula	280- 700	—	49	57	500	5,221,800	22.5

WORLDWIDE PRODUCTION	States of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
ASAMERA (North Sumatra)	Jolu Rayeu, 1968	2,832	3	7	37	623	11,995,681	53.6
	Tualang, 1973	2,631	2	17	35	2,570	27,003,753	49.9
	Other	—	1	9	109	201	20,662,683	—
ASAMERA (South Sumatra)	Corridor Block: Kluang, 1913	2,591	9	23	42	605	§32,928,885	42.6
	Tanjung Laban, 1982	3,590	6	—	4	3,072	1,124,584	38.1
	Rambe, 1982	3,190	29	1	21	22,706	9,501,772	37.0
	Other	—	6	8	111	609	24,008,252	—
CONOCO GROUP	• Udang, 1974	5,595	3	16	5	11,853	45,886,066	40.0
IAPCO	• Cinta, 1970	3,500	—	42	3	14,785	158,678,886	34.0
	• Gita, 1972	5,000	1	6	2	1,246	6,404,703	34.5
	• Kitty, 1973	2,700	—	7	—	1,116	12,695,081	18.0
	• Nora, 1973	3,200	—	5	—	792	8,295,746	29.0
	• Rama, 1974	3,200	—	47	21	8,003	81,852,122	31.0
	• Selatan, 1971	4,000	—	11	4	2,044	19,018,328	19.5
	• Zelda, 1971	7,500	1	32	10	8,253	27,589,363	33.0
	• Virginia, 1979	4,500	—	33	9	10,534	46,690,083	37.0
	• Yvonne, 1980	4,500	—	10	1	11,101	5,681,828	36.0
	• Wanda, 1982	8,000	—	18	4	5,493	8,129,201	32.0
	• Tia, 1982	8,000	—	—	4	12	1,653,466	33.0
	• Surodan, 1982	4,400	—	13	2	4,181	6,425,976	25.0
	• Duma, 1983	2,300	—	3	3	223	441,663	16.0
	• Karmila, 1983	4,800	—	9	1	17,905	13,315,232	36.0
MOBIL OIL	Arun, 1971	10,050	30	—	1	107,275	196,973,712	56.0
PETROMER TRIAD	Conderawasih, 1976	3,500	—	8	4	1,029	10,592,098	28.1
	Jaya, 1973	3,050	—	15	2	3,359	33,277,705	41.4
	Kasim, 1972	3,350	—	35	2	6,227	41,282,452	36.6
	Waiio, 1975	2,750	—	181	32	20,584	129,739,429	33.8
	Other	—	—	8	6	661	10,749,058	—
TESORO	Sambaja, 1909	360- 4,360	—	28	94	560	63,902,330	21.0
	Sanga Sanga, 1897	275- 6,000	16	104	122	3,493	263,621,515	32.0
	Tarakan, 1906	200- 6,540	2	89	1,029	1,978	208,489,077	20.0
LEMIGAS	All fields, 1893-1909	2,155- 2,297	5	66	348	450	130,467,750	—
	Total Indonesia		1,083	4,319	3,881	1,234,000	11,229,447,883	
IRAN[c] NIOC	Agha Jari, 1936	7,440		58	31			34.0
	Ahwaz Asmari, 1958	8,150		73	12			32.0
	Ahwaz Bangestan, 1958	12,000		—	7			24.3
	Bibi Hakimeh, 1961	4,570		19	14			29.9
	Binak, 1959	10,440		—	4			29.9
	Chillingar, 1974	3,350		—	1			39.3
	Chesmeh Khush, 1967	10,700		—	4			27.7
	Dehluran, 1972	11,900		—	6			34.3
	Gachsaran, 1937	3,400		46	16			31.0
	Haft Kel, 1927	1,980		2	9			37.7
	Karanj, 1963	5,360		7	—			33.9
	Khaig, 1961	10,900		—	—			31.6
	Kupal, 1965	10,500		—	7			32.8
	Lab-e Safid, 1960	4,350		—	7			35.3
	Mansuri, 1963	7,100		4	4			28.4
	Marun, 1963	9,400		55	57			32.6
	Masjid-e Suleiman, 1908	1,600		7	17			39.3
	Naft Safid, 1938	5,000		5	14	2,196,000	33,915,276,000	36.8
	Paris, 1964	4,670		22	5			38.8
	Par-e Siah, 1964	4,250		—	1			37.7
	Pazanan, 1961	7,250		44	27			37.2
	Rag-e Safid, 1964	7,230		19	10			28.6
	Ramin, 1966	12,200		—	—			32.9
	Ramshir, 1962	8,750		—	3			27.6
	Sulabedar, 1971	3,400		—	1			30.4
	Naft-e Shah, 1923	2,000- 3,000		—	—			43.0
	• Dahnggonan, 1960	9,000		—	—			30.0
	• Hendijan, 1968	11,000		—	—			23.0
	• Nowruz, 1966	8,200		—	—			21.0
	• Rakhsh, 1969	7,650		—	—			35.8
	• Rostam, 1966	7,000		—	—			34.4
	• Ardeshir, 1969	2,800		—	—			27.0
	• Cyrus, 1962	7,000		—	—			18.3
	• Darius, 1961	11,000		—	—			34.0
	• Fereidoon, 1966	7,000		—	—			29.5
	• Sassan, 1965	7,500- 8,100		—	—			34.0
	Total Iran			361	257	2,196,000	33,915,276,000	
IRAQ[c]	Ain Zalah, 1939	5,200- 6,500						31.0
	Bai Hassan, 1953	4,800- 5,400						34.0
	Butmah, 1953	3,900						30.0
	Hamrin, 1973	2,000						
	Jambur, 1954	5,500-12,500						38.0
	Kirkuk, 1927	2,800- 4,200		NA	NA	NA	1,298,000	17,230,855,000	36.0

*Pertamina took over operation of N.E. Kalimantan from ARCO in July 1984. †Reinstituted Oct. 1, 1984. §Cumulative field production. Previous year's figures reported only Asamera's cumulative production.

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
		Naft Khaneh, 1909	3,500						42.5
		Rumaila North, 1958	10,000						34.0
		Rumaila, 1953	10,800						35.0
		Zubair, 1949	11,000						34.2
		Abu Ghurab	...						27.7
		Buzurgan	...						27.7
		Jabal Fauqui	...						...
		Lahis	...						...
		Total Iraq		NA	NA	NA	1,298,000	17,230,855,000	
ISRAEL	LAPHOTH	Heletz-Brur, 1960	5,200	...	4	...	64	16,317,956	29.2
		Kochav, 1962	5,500	...	2	...	24	4,056,404	27.9
	BEE	Ashdod, 1976	8,400	...	2	...	41	104,670	32.5
	ENRON	Gurim, 1984	3,280	...	1	...	..	6,954	17.0
		Total Israel		–	9	–	129	20,485,984	
ITALY	AGIP	Cavone, 1979	10,663-18,068	4	2	10	2,660	4,565,814	24.0
		Malossa, 1973	17,881-21,231	6	...	4	4,830	22,967,428	55.0
		Policoro-S. Casciolo, 1960	6,820- 6,880	6	1	5	805	6,383,335	11.4
		• Goto, 1956	11,280-11,350	44	16	12	6,710	90,687,380	10.0
		• Porta	7,650	4	4	...	925	760,969	13.3
		• Cola Mare	10,300	8	3	6	1,260	13,747,754	10.0
		Ragusa, 1954	...	29	30	16	4,545	122,227,280	...
		• Nilde, 1977	...	2	...	...	9,420	9,365,810	...
		Other	...	16	...	49	610	19,868,762	2.8-55.9
	ELF	• Santa Maria a Mare, 1970	7,900	11	...	...	2,900		23.0
		• Rospo Mare, 1975	4,600	...	3	...	2,500	18,286,300	11.0
		• Surago Mare, 1979	5,200	6	...	...	4,500		8.0
		Total Italy		136	58	102	41,865	308,860,832	
IVORY COAST	ESSO COTE D'IVOIRE	• Belier, 1975	6,500	6	8	...	5,600	12,500,000	33.0
	PHILLIPS	• Espoir, 1980	6,500-11,000	6	...	2	16,488	15,857,921	33.0
		Total Ivory Coast		12	8	2	22,088	28,357,921	
JAPAN	JAPEX	• Ago-Oki, 1972	7,590	11	...	2	817	4,355,945	24.8
		Higashi-Niigata, 1965	4,500- 9,200	20	...	7	1,100	7,679,304	53.9
		Sarukawa, 1958	2,000- 3,200	6	16	49	669	10,043,513	32.3
		Yoshii, 1968	8,000	10	...	14	889	8,021,058	61.8
		Other	...	...	...	...	1,537	27,397,813	...
	TEIKOKU OIL	Kubiki, 1959	1,100- 6,400	20	75	32	494	12,349,875	29.7
		Minami-Aga, 1964	7,300- 9,600	9	2	15	506	13,183,799	38.5
		Yabase, 1933	1,100- 5,800	...	61	9	342	32,726,807	33.0
		Other	...	4	22	6	87	2,436,117	...
		Total Japan		80	176	134	6,441	118,194,231	
KUWAIT[a]	KOC	Burgan, 1938	4,800	322	...	67			30.9
		Ahmadi, 1953	4,800	63	...	22			31.7
		Magwa, 1951	4,800	84	...	27			33.0
		Raudhatain, 1955	8,600	43	...	4			33.9
		Bahra, 1956	8,500	...	...	2	857,000	21,630,575,000	...
		Sabriya, 1957	8,300	30	...	15			34.4
		Minagish, 1959	10,000	9	...	6			34.2
		Umm Gudair, 1962	9,000	21	...	10			24.6
		Total Kuwait		572	...	153	857,000	21,630,575,000	
LIBYA	AGIP	Bu Attifel, 1968	14,300	31	...	...	153,120	646,919,000	41.0
		Rimal-Kabir, 1965	14,000	6	...	1	3,670	2,105,000	35.0
	ELF	El Maheriga	10,500	2	...	...	1,200	28,000	46.0
	LIBIC[b]	Arshot, 1966	10,100						42.0
		Jebel, 1962	8,100						38.0
		Mayid, 1968	9,000- 9,800						...
		Dor Mansour Unit	5,600						...
		Nasser, 1959	5,500- 7,600						38.0
		Lehib-Dor Mawda Unit, 1965	9,500						50.0
		Raguba, 1961	5,400						43.0
		Sheda, 1960	4,000						36.0
		Bu Attifel, 1972	6,000	NA	NA	NA	422,736	6,913,861,000	40.0
		Dor, 1967	6,400						33.2
		Kotla, 1963	5,500						34.0
		Sahabi B & D, 1961	9,000-10,000						39.0
		Sarir, 1961	9,000						37.2
		Amal, 1959	9,900						37.5
		Ora, 1962	7,250						40.2
		Zhan, 1978	6,000						40.0
		Other	...						...

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells — Flow	Artificial lift	Shut-in	Bbl [illegible] first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
OASIS GROUP[b]	Bahi, 1968	3,500- 3,750						43.4
	Bethedan, 1962	7,000						33.6
	Dahra, 1959	3,100- 3,700						37.0-41.0
	Defa, 1969	5,400- 5,900						35.6
	Gialo, 1961	2,200- 6,300						35.7
	Harsh, 1978	7,400	...	491	...	295,935	4,850,095,000	34.6
	Khalifa, 1978	5,400- 7,000						34.6
	Masrab, 1978	10,000						39.6
	Sameh, 1961	9,000						33.4
	Waha, 1960	6,000						36.0
	Zaggut, 1962	6,000						36.4
	Balat, 1983	5,100- 5,400						32.2
OCCIDENTAL	Ali, 1975	3,900	...	1	1	361	4,951,338	50.0
	Almas, 1975	4,000	...	5	3	727	16,516,182	49.5
	Intisar A, 1967	9,750	8	...	11	14,896	693,057,719	45.0
	Intisar B, 1974	9,600	2	...	...	705	5,850,562	50.0
	Intisar C, 1967	9,650	1	...	5	348	86,152,606	37.5
	Intisar D, 1967	9,400	13	6	8	53,653	986,754,989	39.0
	Intisar E, 1968	5,300- 7,100	...	8	3	1,845	14,840,751	34.7
	Nafoora-Augila, 1966	2,200-10,000	13	...	42	35,901	796,598,000	35.5
	Aswad, 1978	6,250	8	...	...	4,092	13,438,813	46.0
	Sarah, 1977	5,500	...	36	2	31,781	74,811,187	42.0
	Zella, 1977	6,750	27	...	4	12,686	51,132,736	48.1
	Other	7,900- 8,900	...	1	1	269	1,453,018	40.4
	Fidas, 1979	7,000	2	7	...	10,477	4,214,279	41.7
	Hakim, 1978	6,700	3	...	...	1,661	311,226	48.5
	Total Libya		**116**	**588**	**81**	**1,046,000**	**15,183,191,318**	
MALAYSIA ESSO MALAYSIA[c]	• Belick, 1976	5,500	23	...	7			47.0
	• Pulai, 1973	4,300	19	4	9			42.3
	• Tapis, 1975	6,700	70	...	36			45.0
	• Temburgo, 1971	6,000	10	1	4	251,620	398,515,650	38.0
	• Kepong, 1979	6,000	3	...	7			47.0
	• Tiong, 1978	5,800	28	...	14			47.0
	• Tinggi, 1980	4,400	26	...	5			48.0
	Irong Barat, 1979	3,300	10	...	2			35.0
	Semangkok, 1980	3,700	5	...	...			42.5
SARAWAK SHELL BERHAD	• Bakau, 1971	11,000	2		1	410	6,792,676	39.0
	Baram, 1963	9,500	17		19	14,859	125,791,779	40.5
	Baronia, 1967	7,900	25		15	21,437	133,017,253	42.0
	Betty, 1967	7,900	8		6	14,445	46,317,729	38.0
	Fairley-Baram, 1963	8,655	...		2	...	5,849,413	40.0
	West Lutong, 1966	5,600	11		16	7,907	114,022,084	39.5
	Miri, 1911	...	...		...	...	79,727,300	27.0
	Temana, 1972	3,100	16		6	15,134	26,829,036	35.0
	Tukau, 1966	5,000	23		21	20,072	70,779,493	29.2
	Bokor, 1972	2,900	9		2	18,708	12,057,302	35.0
	Bayan, 1976	4,200	6		1	20,414	6,267,998	37.3
SABAH SHELL	Samarang, 1972	5,700	31		31	42,543	189,330,607	37.0
	South Furious, 1974	3,300	7		8	3,001	8,418,972	30.0
	• Erb West, 1972	6,875	9		5	11,418	14,545,653	30.0
	• St. Joseph, 1975	2,200	3		6	10,867	8,525,600	32.0
	• Barton, 1971	2,400	4		...	5,165	5,544,530	37.0
	Total Malaysia		**370**		**223**	**498,000**	**1,292,333,078**	
MEXICO NORTH ZONE, NE	Mision, 1945	5,440	3	...	...	2	1,876,257	...
	Monterrey, 1950	6,510	1	4	1	39	12,028,304	...
	Tigrillo, 1971	3,342	...	...	11	...	1,372,723	...
	Other	...	2	9	66	22	17,704,589	...
NORTH ZONE, N.	• Arenque, 1970	11,362	17	...	...	6,567	71,328,461	26.0
	Constituciones, 1956	6,350	76	100	...	6,036	73,761,169	17.0
	Ebano-Panuco, 1901	1,450	141	183	...	3,843	940,973,898	12.0
	Tamaulipas	4,200	65	87	...	6,205	71,342,086	19.0
	Other	...	...	...	...	622	23,137,722	...
NORTH ZONE, S.	Chicontepec, 1973	4,264	219	1	...	4,271	10,810,818	34.1
	• Isla de Lobos, 1963	6,875	9	...	...	538	20,971,659	40.0
	• Marsopa, 1974	10,198	7	...	...	1,176	13,581,242	39.0
	Naranjos-C. Azul, 1909	1,800	206	...	...	8,432	1,209,699,719	22.0
	Tres Hermanos, 1959	6,960	34	...	...	2,918	105,162,139	21.0
	Other	...	...	...	...	634	24,818,912	...
CENTRAL ZONE, POZA RICA	• Atun, 1966	9,040	7	...	...	1,881	36,177,004	37.0
	• Bagre, 1973	10,919	8	...	...	4,472	40,256,686	33.0
	Escolin, 1942	7,216	...	95	...	10,680	211,786,036	26.3
	Hallazgo, 1955	10,170	...	36	...	4,788	74,559,490	25.0
	Jiluapa, 1958	7,390	...	29	...	1,184	28,032,955	24.0
	Mecatepec, 1941	7,544	1	31	...	2,361	135,636,076	29.8
	Miquetla, 1959	6,480	1	56	...	1,089	25,204,999	35.0
	Poza Rica, 1930	7,090	...	132	...	16,423	878,038,379	35.0
	Pres. Alemán, 1949	8,036	44	42	...	2,040	31,968,063	26.0

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	Remolino, 1962	10,745	...	36	...	970	21,188,104	29.5
	San Andrés, 1956	10,410	5	118	...	15,919	340,346,660	29.0
	Other	...	114	201	1	7,479	98,999,388	...
CENTRAL ZONE, CUENCA DEL PAPALOAPAN	Matapionche, 1974	11,129	21	8	16	5,068	23,401,549	35.6
	Other	...	22	...	9	1,663	29,484,161	...
SOUTHERN ZONE, NANCHITAL	Ixhuatlán Ote., 1965	1,960	1	19	14	1,274	9,851,549	22.6
	Moloacán, 1962	500	1	169	37	2,426	20,664,575	22.3
	Santa Rosa, 1952	1,312	6	...	3	166	5,189,841	25.4
CENTRAL ZONE, N. FAJA DE ORO	Acuatempa, 1955	4,085	6	...	...	227	25,830,426	21.0
	Muro, 1965	3,966	11	...	8	567	19,513,511	17.0
	Ordóñez, 1952	5,220	8	...	...	1,051	57,541,952	21.0
	Ocotepec, 1953	3,737	13	...	...	431	19,709,872	20.0
	Santa Agueda, 1953	4,780	13	...	...	2,085	102,748,748	16.0
	Other	...	50	7	...	1,367	56,575,363	...
SOUTHERN ZONE, EL PLAN	Agata, 1956	3,830	2	7	6	478	11,678,492	...
	Bacal, 1976	3,500	18	6	16	11,534	78,740,811	35.0
	Concepción, 1974	1,600	2	1	12	424	4,125,234	31.0
	Cuichapa, 1935	2,200	18	45	60	10,114	122,203,743	30.0
	El Plan, 1931	1,700	1	66	19	2,486	152,840,364	30.0
	Lacamango, 1973	1,700	8	10	9	1,763	10,172,282	26.3
	Los Soldados, 1953	4,492	3	15	4	1,031	23,780,584	32.0
	Other	...	19	7	12	280	37,664,357	...
SOUTHERN ZONE, AGUA DULCE	Blasillo, 1967	7,216	15	16	27	5,263	24,469,974	40.0
	Cinco Presidentes, 1960	6,862	10	63	61	8,773	246,584,140	35.0
	Burro, 1931	2,200	1	22	15	1,079	21,893,414	26.0
	Venta, 1954	4,730	3	17	63	1,155	58,467,450	41.0
	Ogarrio, 1957	5,790	14	43	137	6,697	134,393,606	38.0
	Otates, 1965	7,469	1	11	6	1,799	25,087,885	39.0
	Rodador, 1971	11,398	4	10	...	1,820	7,974,839	26.0
	Sánchez Magallanes, 1957	4,240	3	70	272	5,985	132,515,022	27.0
	San Ramón, 1967	9,517	5	24	36	5,332	57,306,963	30.0
	Tonalá, 1928	1,770	1	30	30	1,330	77,498,945	28.0
	Other	...	3	...	12	174	1,085,176	...
SOUTHERN ZONE, COMALCALCO	Agave, 1977	13,450	7	...	9	12,236	86,670,809	41.7
	Arroyo Zanapa, 1978	14,599	1	...	1	1,667	8,563,502	38.9
	Arteza, 1977	11,800	2	1	2	1,585	28,648,988	26.4
	Ayapa, 1972	8,200	3	...	2	573	5,294,293	7.2
	Cacho López, 1977	14,250	1	...	...	73	2,326,897	29.0
	Cáctus, 1972	14,100	14	...	16	13,346	264,123,138	31.5
	Carrizo, 1962	3,500	11	7	17	830	10,309,757	23.3
	Castarrical, 1967	10,080	19	19	21	1,681	37,328,414	29.3
	Comoapa, 1979	14,432	4	...	2	5,673	14,758,988	44.5
	Copano, 1977	11,890	9	...	1	11,867	15,660,987	43.9
	Cunduacán, 1974	13,775	8	4	30	27,428	378,944,201	28.9
	El Golpe, 1963	3,500	48	45	42	3,444	74,371,538	25.7
	Giraldas, 1977	15,225	21	...	1	40,419	104,452,256	37.0
	Iride, 1974	13,775	12	...	4	38,727	145,053,560	28.5
	Muspac, 1982	9,676	1	...	12	21	905,653	57.0
	Mecoacán, 1957	2,200	9	8	13	481	36,562,694	8.6
	Mora, 1981	...	61	...	2	48,534	26,408,860	38.1
	Mundo Nuevo, 1977	11,800	4	...	1	5,204	23,237,707	46.0
	Níspero, 1974	14,100	4	...	14	5,057	105,957,000	34.4
	Paredón, 1978	15,690	12	...	1	47,315	87,812,979	39.8
	Oxiacaque	11,150	5	...	16	2,889	93,557,426	29.1
	Platanal, 1978	15,900	...	...	...	...	2,967,641	30.2
	Río Nuevo, 1975	14,950	5	...	...	11,668	58,044,931	34.8
	Samaria (Cret), 1973	14,209	25	1	23	112,004	917,120,048	31.0
	Santuario, 1966	9,617	19	9	9	4,768	32,351,804	37.0
	Sitio Grande, 1972	13,766	19	...	3	38,206	267,942,747	35.0
	Sunuapa, 1978	12,887	2	...	5	1,260	22,663,065	32.8
	Tapijulapa, 1982	15,613	1	...	11	57	104,430	39.8
	Tintal, 1968	5,904	4	...	2	200	4,260,569	22.0
	Topén, 1978	11,172	2	...	1	1,680	2,556,011	25.4
	Tupilco, 1959	9,685	36	31	34	2,433	47,150,349	27.0
	Bellota, 1982	17,056	9	...	3	38,725	18,879,605	41.0
	Cardenas, 1979	17,548	26	...	19	103,074	131,966,949	38.0
	Chiapas, 1979	12,136	5	...	2	9,423	23,978,820	42.0
	Fenix, 1979	17,876	4	...	3	9,787	21,819,563	40.0
	Iris, 1979	14,432	8	...	...	3,998	10,269,576	39.2
	Jujo, 1980	17,548	18	...	1	121,200	91,548,208	32.0
	Caparroso, 1982	18,368	1	...	...	235	242,278	41.2
	Tecominoacan, 1983	19,519	1	...	4	10,707	7,636,304	37.5
	Jolote, 1983	18,119	1	...	...	1,201	1,169,462	39.4
	Artesa Terc., 1984	...	1	1	1	570	365,084	29.0
	Carmito, 1980	10,050	1	...	...	1,738	1,447,052	45.6
	Edén, 1983	17,590	1	...	1	5,375	3,380,252	38.5
	Samaria Terc., 1965	4,920	10	6	7	710	5,748,790	13.9
	Other	...	16	...	21	33,850	222,513,264	...
GULF OF CAMPECHE	• Cantarell, 1976	8,528	63	...	12	945,417	1,815,507,659	21.3
	• Abkatun, 1978	11,800	25	...	10	413,608	552,462,066	30.0
	• Ku, 1979	10,000	8	...	7	176,403	235,211,094	22.0
	• Pol, 1979	12,600	8	...	...	124,411	148,762,978	35.0
	• Chuc, 1982	13,100	1	...	2	25,378	27,698,915	35.0
	• Istac, 1984	...	1	...	1	3,100	1,829,277	35.0
	Total México		1,770	1,856	1,302	2,864,868	12,357,308,345	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	Bbl average first 5 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
MOROCCO(e)		Hancha, 1957	3,000	—	—	—	290	3,268,000	40.0
		Other	—	—	—	—	—	12,554,000	—
		Total Morocco		—	—	—	290	15,822,000	
NETHERLANDS	UNION	• Heim, 1979	4,400	1	6	—	4,549	4,352,802	18.3
		• Helder, 1980	4,800	—	12	—	8,743	9,572,730	21.9
		• Hoorn, 1981	5,000	—	6	—	10,577	9,853,005	26.0
	CONOCO	Kotter, 1980	6,500	7	—	—	*5,577	1,335,500	30.8
	ROYAL DUTCH SHELL GROUP	De Lier-Munster, 1955	5,200		33	—	647	16,269,902	33.2
		Bennel, 1954	NA		11	—	1,870	2,382,730	32.1
		Ysselmr-Ridderwerk, 1956	5,200		77	9	4,571	84,938,543	18.0
		Pijnacker, 1955	NA		5	—	150	5,569,063	36.3
		Wanssenaar, 1956	4,200		38	3	1,931	44,707,188	18.6
		Zoeterwoer, 1957	3,200		22	—	505	9,294,445	16.4
		Schoonebeek, 1943	2,500		356	—	12,779	222,177,883	24.8
		Other	—		70	21	731	4,345,847	—
*Conoco Netherlands net only.		**Total Netherlands**			644	33	52,630	414,799,638	
NEUTRAL ZONE	ADC	• Khafji, 1961	4,400-10,300	111	—	11	243,000	2,173,000,000	28.2
		• Hout, 1969	5,300-10,500	48	—	21	23,000	248,000,000	33.0
	GETTY & KOC	Wafra, 1953	1,100- 7,000	2	310	80	85,000	1,254,000	18.9-23.5
		S. Fuwaris, 1963	6,300	—	6	3	2,500	21,000,000	25.0
		S. Umm Gudair, 1966	8,900	—	16	2	43,000	287,000,000	24.3
		Total Neutral Zone		161	332	117	396,500	3,963,000,000	
NEW ZEALAND	SHELL-BP-TCBD	• Kapuni, 1959	10,318-11,775		9	3	—	34,000,000	54.0
	MAUI DEVELOPMENT LTD.	• Maui, 1969	8,615-11,068		11	3	—	15,000,000	58.0
	PCNZ	McKee, 1981/Pouri, 1983	7,848- 8,251		4	2	—		36.0
		Kaimiro, 1982	11,856-11,900		1	—	—		—
		Tuhua, 1983	8,490- 7,893		2	—	—	800,000	42.0
		Pukemau, 1983	8,540- 8,631		1	1	—		42.0
		Toe Toe, 1984	7,388- 8,195		—	—	—		38.7
		Total New Zealand			28	9	17,000	48,800,000	
NIGERIA	AGIP-PHILLIPS	Alen, 1977	9,600-10,600	9	—	—	13,579	53,683,940	39.9
		Alen West, 1975	9,900-10,200	—	—	2	—	482,258	31.4
		Ashaka, 1968	9,700-12,000	1	—	—	768	1,839,988	41.0
		Bemku, 1974	12,000	1	—	1	1,097	3,014,069	44.3
		Ebegoro, 1976	11,500-12,000	8	—	2	9,247	51,492,586	35.7
		Ebocha, 1965	8,000-10,900	15	—	3	11,368	101,285,649	38.5
		Idu, 1973	7,750-10,700	—	—	5	—	23,862,581	28.0
		Kwale, 1968	10,000-11,500	3	—	2	1,974	2,326,151	44.3
		M'Bede, 1966	7,300- 9,400	12	—	3	14,838	143,941,540	41.1
		Obama, 1975	11,600-14,300	12	—	1	18,975	76,696,573	38.2
		Obrafu, 1973	9,300-12,200	13	—	3	12,678	68,885,921	41.3
		Obrikom, 1973	8,000-10,000	7	—	—	7,350	48,347,523	41.5
		Odugh, 1972	12,500	3	—	2	1,378	9,031,399	44.8
		Ogbogene, 1976	10,000-12,000	1	—	2	83	3,294,764	37.0
		Ogbogene W., 1981	13,000	1	—	—	99	348,367	56.2
		Okpai, 1968	10,000-12,000	8	—	1	637	13,676,269	42.3
		Omoku West, 1975	11,500	1	—	—	1,331	4,268,269	35.0
		Oshi, 1974	9,600-11,300	14	—	—	12,474	53,869,308	39.5
		Tebidaba, 1975	10,300-13,300	14	—	1	19,543	94,998,218	35.5
		Umuoru, 1975	14,100	3	—	—	2,930	2,511,463	43.0
		Agwe, 1977	10,800	1	—	—	1,315	1,522,830	55.0
		Clough Creek, 1977	10,000-12,400	10	—	1	9,291	11,637,821	43.0
		Benibaye North	—	9	—	—	3,050	552,077	34.3
	PHILLIPS	Gbli-Gbli, 1967	7,600-14,000	2	—	1	1,093	2,372,282	47.4
	ASAMERA	Imembe-Otou, 1974	9,500	16	—	6	12,179	39,893,852	43.0
		• Akam, 1980	7,000	9	—	—	11,174	6,482,197	36.0
	ELF	Aghigo, 1972	—	13	—	6	5,954	19,017,945	25.7
		Okpoko, 1967	—	13	—	7	7,979	21,578,110	23.0
		Obodo-Jatum, 1966	—	15	—	7	13,218	50,331,407	31.1
		Upomini, 1965	—	8	—	7	2,865	12,732,769	19.8
		Obagi, 1964	—	51	—	4	64,434	304,050,581	24.0
		Erema, 1972	—	2	—	2	2,148	5,632,134	35.4
	GULF	Abiteye, 1970	5,750- 9,400	11	—	8	11,296	53,167,333	37.8
		• Delta, 1965	5,600- 9,500	22	—	5	15,986	147,432,784	34.0
		• Delta South, 1965	7,100-10,179	18	—	9	23,651	233,668,790	38.6
		• Isan, 1970	5,900- 9,000	—	—	—	—	—	39.4
		Makaraba	7,100-12,005	20	—	6	21,397	63,810,529	31.5
		• Malu, 1969	4,800- 6,300	12	—	6	17,954	81,893,314	40.0
		• Meta, 1965	8,570-12,030	4	—	1	4,084	12,500,905	37.1
		• Meji, 1965	5,200-10,900	19	—	3	14,713	129,105,971	32.9
		• Meren, 1965	5,000- 7,500	31	—	19	51,116	420,462,798	31.3

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	• Okan, 1964	5,500- 9,245	45	...	22	41,230	395,594,585	36.0
	• Parabe/Eko, 1968	4,500- 8,200	14	...	9	6,257	92,730,533	36.7
	Utonana, 1971	7,400- 9,165	2	...	3	936	7,881,679	35.6
	• W. Isan, 1971	7,825-10,229	6	...	3	3,178	31,549,166	38.1
	Yoria South, 1974	11,389-12,635	...	...	2	...	834,040	...
	Jisike, 1975	6,300- 7,600	3	...	1	2,462	3,949,111	44.0
	Robertkiri, 1964	11,484-13,190	11	...	1	2,185	2,942,313	...
	• Tapa, 1978	8,150-10,842	10	...	...	10,062	15,068,782	36.0
MOBIL	• Adua, 1967	6,970	4	...	1	6,513	35,929,006	30.3
	• Asabo, 1966	5,600	6	...	4	15,207	143,143,363	32.4
	• Ekpe, 1966	8,200	5	...	3	18,088	173,661,727	30.3
	• Ekpe-WW, 1977	6,810	9	...	1	9,644	24,703,879	30.3
	• Eku, 1966	5,420	4	...	2	2,219	14,044,746	30.8
	• Enang, 1968	6,600	19	...	2	25,077	102,058,500	35.1
	• Etim, 1968	6,200	9	...	...	16,134	89,546,945	32.9
	• Idoho, 1966	9,020	2	...	...	946	26,944,792	30.8
	• Inim, 1966	5,850	8	...	1	18,563	123,660,196	37.8
	• Mfem, 1967	5,200	3	...	...	4,515	20,261,316	36.1
	• Ubit, 1968	5,400	34	...	3	24,751	153,527,309	36.1
	• Unam, 1968	5,180	6	...	3	5,535	34,947,995	33.5
	• Utue, 1966	5,700	5	...	2	8,533	60,025,090	36.8
	• Isobo, 1968	4,345	2	...	2	2,334	5,417,723	30.8
	• Iyak	NA	7	...	1	22,314	13,714,294	38.7
	Asabo 'D'	...	1	...	...	1,405	573,042	...
INPEX	Ogharefe, 1973	9,900	7	...	5	5,751	23,417,871	47.4
SHELL (MIDWEST)	Ugh-Ogini, 1964	5,860	4	...	...	1,487	18,511,651	19.0
	Ugh-Uzere-East, 1960	8,500	6	...	...	5,084	82,124,077	23.0
	Ugh-Uzere-West, 1964	8,500	4	...	...	2,352	94,530,804	23.0
	Ugh-Olomoro, 1963	7,000-10,000	11	...	...	25,636	260,080,086	22.0
	Ugh-Oweh, 1964	12,300	6	...	...	4,641	89,896,808	28.0
	Ugh-Kokori, 1960	8,000- 9,800	4	...	...	19,793	295,907,085	42.0
	Ugh-Afiesere, 1966	8,000- 9,000	13	...	...	12,185	105,487,739	22.0
	Ugh-Eriemu, 1961	12,500	12	...	...	4,507	36,570,984	26.0
	Ugh-Ughelli-East, 1959	11,800	5	...	...	3,424	86,105,680	35.0
	Ugh-Ughelli-West, 1963	7,400-10,200	2	...	...	2,320	29,469,014	21.0
	Ugh-Utorogu, 1964	9,000	7	...	...	8,813	123,498,492	25.0
	Ugh-Oroni, 1964	12,000	3	...	...	1,936	24,981,985	22.0
	Ugh-Warri-River, 1961	12,264	1	...	...	1,119	13,985,944	31.0
	Ugh-Evwreni, 1968	10,900	4	...	...	1,274	32,722,332	28.0
	Ugh-Isoko, 1960	NA	1	...	...	479	5,172,300	19.0
	Forc-Odidi, 1967	10,980	6	...	...	18,899	185,084,360	37.0
	Forc-Opukushi, 1963	7,823	4	...	...	27,097	93,523,666	29.0
	Forc-Jones Creek, 1967	7,000- 9,000	11	...	...	28,242	362,913,571	29.0
	Forc-Opuama, 1973	NA	1	...	...	4,021	22,418,782	41.0
	Forc-Egwa, 1967	9,350	8	...	...	10,170	121,298,361	37.0
	Forc-Forcados/Yokri, 1968	10,859	39	...	...	58,851	470,886,438	22.0
	Forc-Batan, 1968	11,000	3	...	...	4,529	51,965,451	27.0
	Forc-Escravos Beach, 1969	9,931	1	...	...	6,044	50,701,224	36.0
	Forc-Otumara, 1969	8,176	7	...	...	25,900	131,605,207	25.0
	Forc-Saghara, 1970	9,590	1	...	...	4,949	27,751,626	31.0
	Forc-Ajuju, 1970	13,324	...	...	...	697	9,251,033	27.0
	Forc-Benisede, 1973	...	4	...	...	28,056	81,013,702	23.0
	Node-Sapele, 1970	12,788	11	...	...	16,088	94,909,399	42.0
	Node-Oben, 1972	12,036	17	...	...	34,725	91,797,674	40.0
	Forc-Opukushi N., 1977	NA	...	...	...	855	1,981,305	30.0
	Abura	...	3	...	...	4,363	13,219,197	44.8
	Rapele	...	...	...	...	2,243	21,159,563	44.4
SHELL (EAST)	Phl-Bomu, 1956	6,500- 7,500	10	...	...	7,576	341,128,647	36.0
	Phl-Imo River, 1959	5,800-10,000	24	...	...	28,784	429,146,690	32.0
	Phl-Nkali, 1963	12,000	1	...	...	125	27,177,627	42.0
	Phl-Elelenwa, 1959	11,000	1	...	...	2,412	28,676,633	39.0
	Phl-Umuechem, 1969	5,800-10,700	5	...	...	8,411	141,408,059	36.0
	Phl-Apara, 1960	9,000	4	...	...	2,835	20,948,592	36.0
	Phl-Bodo-West, 1959	9,700	1	...	...	5,283	72,880,925	29.0
	Phl-Afam, 1956	6,000	8	...	...	4,813	54,948,739	45.0
	Phl-Yoria, 1970	11,917	8	...	...	5,651	54,309,634	44.0
	Phs-Bonny, 1959	12,254	11	...	...	6,491	81,447,212	36.0
	Phs-Cawthorne Channel, 1963	11,000	17	...	...	49,276	229,526,064	38.0
	Phs-Ekuiama, 1958	10,483	16	...	...	32,049	161,807,797	32.0
	Phs-Soku, 1958	11,500	8	...	...	7,685	97,859,543	31.0
	Phs-Orubiri, 1971	NA	2	...	...	4,986	12,723,885	38.0
	Egb-Oguta, 1965	10,300	8	...	...	9,550	120,599,632	46.0
	Eade-Utapate South, 1974	NA	5	...	...	8,463	29,674,853	44.0
	Eade-Opatio South, 1974	NA	6	...	...	9,642	10,394,824	44.0
	Korokoro	...	3	...	...	3,732	78,909,154	34.3
	Otamini	...	1	...	...	818	12,101,386	21.8
	Ugada	...	1	...	...	193	961,689	...
	Ahia	...	8	...	...	6,435	79,511,833	38.2
	Akpor	...	2	...	...	588	1,702,107	27.5
	Alakiri	...	4	...	...	1,926	58,519,175	38.2
	Assa	...	2	...	...	987	4,546,227	20.7
	Egbema West	...	8	...	...	5,593	72,302,416	42.2
	Ebubu	...	2	...	...	196	18,493,256	22.2
	Egbema	...	6	...	...	2,901	46,498,422	35.5

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. - 1985	Cumulative bbl to July 1, 1985	°API gravity
		Cesw-Nun River, 1960	NA	4	...	...	4,127	27,899,099	39.0
		Cesw-Etelebou, 1971	12,000	9	...	...	17,169	108,867,160	33.0
		Cesw-Kolo Creek, 1960	12,000	14	...	...	22,424	108,869,248	42.0
		Cesw-Diebu Creek, 1966	NA	17	...	...	12,363	92,540,387	43.0
		Phl-Ismiri, 1964	5,900-11,000	4	...	...	2,776	35,453,724	28.8
		Phl-Onne, 1965	10,384	3	...	...	819	8,198,220	29.0
		Phl-Obigbo-North, 1963	6,500-10,000	23	...	...	15,404	156,149,830	22.0
		Phl-Ajokpori, 1967	NA	1	...	...	854	4,268,953	29.0
		Phl-Agbada, 1960	8,000-12,000	24	...	...	21,887	154,933,779	32.1
		Phl-Akuba, 1967	NA	1	...	...	289	3,762,308	29.0
		Cesw-Adibawa, 1967	11,950	7	...	...	16,984	61,346,818	26.0
		Cesw-Adibawa NE, 1973	NA	2	...	...	4,541	11,672,333	26.0
		Cesw-Ubie, 1961	14,380	...	...	...	5,385	26,186,447	28.0
		Phl-Obeakpu, 1975	NA	1	...	...	1,280	12,973,574	45.0
		Cosw-Nembe Creek, 1973	NA	17	...	...	56,573	134,499,600	35.0
		Phs-Akaso, 1979	NA	1	...	...	1,390	1,520,097	30.0
	TEXACO-CHEVRON	• Pennington, 1965	5,000-10,400	3	...	8	1,755	22,436,845	37.5
		• Middleton, 1972	5,000- 7,000	7	...	3	2,307	12,353,758	37.5
		• North Apoi, 1973	4,000- 8,100	5	...	23	18,349	121,110,595	36.5
		• Funiwa, 1978	5,000- 7,000	3	...	16	13,296	15,594,115	37.5
		• Sengana, 1967	...	2	...	...	395	444,733	38.5
		Total Nigeria		1,153	...	247	1,487,748	10,512,023,308	
NORWAY	PHILLIPS	• Ekofisk, 1968	10,000	41	...	5	132,841	822,902,957	41.1
		• West Ekofisk, 1970	10,300	10	...	...	11,999	75,227,718	43.9
		• Cod, 1968	9,500	6	...	...	3,903	16,942,791	55.0
		• Tor, 1970	10,000	10	...	3	17,741	103,194,923	38.0
		• Albuskjell, 1972	10,400	14	...	4	9,380	44,641,535	45.0
		• Edda, 1972	10,480-10,600	7	...	...	3,847	20,990,153	41.5
		• Eldfisk, 1970	9,350-10,000	29	...	3	62,333	167,731,582	37.6
	MOBIL	• Statfjord, 1974	7,700	35	...	...	*414,064	570,800,000	39.0
	AMOCO	• Valhall, 1972	8,200	12	...	6	62,153	37,492,046	35.0
*Norway's 84.09% share of production. †Norway's production share.	CONOCO	• Murchison, 1975	9,900	14	...	...	†37,646	36,983,700	39.0
		Total Norway		178	...	21	755,907	1,896,907,405	
OMAN	PDO	Lakhwair, 1968	4,352	10	18	26	14,580	41,568,000	37.8
		Shibkah, 1976	2,591	2	...	...	484	477,000	25.7
		Natih, 1963	4,788	12	19	25	27,883	318,599,000	31.0
		Fahud, 1964	2,499	26	80	77	69,056	688,315,000	32.7
		Al Huwaisah, 1969	5,320	1	34	3	19,247	149,766,000	37.0
		Ghaba North, 1972	2,227	1	8	5	7,101	39,673,000	35.8
		Saih Nihaydah, 1972	8,700	1	12	5	24,763	120,929,000	39.0
		Saih Rawl, 1973	9,826	7	7	8	9,693	78,408,000	41.1
		Qarn Alam, 1972	1,354	...	4	2	1,749	17,783,000	14.8
		Habur, 1975	5,800	...	1	1	289	4,076,000	16.2
		Mahjour, 1979	11,700	1	...	3	591	1,363,000	37.2
		Zaulyah, 1981	8,177	6	...	2	9,227	3,664,000	45.5
		Rima, 1979	3,247	9	21	1	66,037	44,086,000	32.8
		Birba, 1978	8,528	2	...	1	6,919	5,604,000	33.4
		Marmul, 1977	5,087	...	137	4	48,180	70,344,000	22.0
		Rahab, 1977	3,237	...	13	6	2,164	2,516,000	22.0
		Qaharir, 1978	4,536	...	23	3	7,428	14,227,000	30.6
		Qata, 1979	4,707	...	10	3	2,057	1,749,000	26.2
		Yibal, 1962	8,465	26	98	7	125,148	473,211,000	40.2
		Burhaan, 1984	4,011	1	...	...	2,428	371,000	36.7
		Al-Ghubar, 1974	1,916	4	1	...	4,906	317,000	23.5
		Anzauz, 1984	7,098	1	...	...	5,044	988,000	47.8
		Hasirah, 1984	8,708	...	...	1	2,082	191,000	48.8
		Suwaihat, 1982	6,452	5	...	2	6,604	601,000	36.0
		Bahja, 1984	5,697	2	...	1	1,855	227,000	44.5
		Rasha, 1982	4,310	...	4	...	1,032	243,000	22.3
		Nimr, 1980	3,296	...	5	...	862	26,000	21.3
		Karim West, 1982	3,546	...	6	2	4,875	593,000	23.5
		Amal/Amal South, 1973	4,638	...	6	3	4,019	1,472,000	22.5
		Qaharir East, 1978	4,936	...	1	2	182	459,000	30.6
	ELF GROUP	Sahmah, 1978	12,400	5	...	...	7,262	17,582,000	45.1
	OCCIDENTAL PETROLEUM	Safah, 1983	6,500	11	...	...	273	621,000	37.8
		Total Oman		130	508	183	484,020	2,100,139,000	
PAKISTAN	UNION TEXAS	Khaskeli, 1981	3,500	6	...	2	3,447	4,094,936	39.0
		Laghari, 1983	2,600	5	...	1	7,305	2,543,970	42.0
		Other	...	...	...	11	...	...	31.4-46.0
	PAKISTAN PETROLEUM	Adhi, 1978	9,118- 9,190	3	...	...	1,090	1,007,684	48.5
	OGDC	Toot, 1968	14,900	8	...	3	2,338	7,802,619	38.0
		Fimkassar, 1982	11,465	1	...	...	31	12,138	39.0
		TandoAlam, 1984	8,203	4	...	...	3,515	994,809	40.9

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	PAKISTAN OILFIELDS LTD.	Balkassar, 1946	8,398	...	3	2	529	31,157,884	26.0
		Dhulian, 1936	8,899	10	...	3	25	41,284,449	48.0
		Joya Mair, 1944	6,900	...	1	2	264	5,487,642	15.0
		Meyal, 1968	13,521	7	...	3	3,698	26,653,772	47.0
		Khaur, 1915	9,306	...	1	...	9	4,158,685	...
	OCCIDENTAL PAKISTAN	Dhurnal-1, 1984	13,125	2	...	...	8,463	2,215,811	38.0
		Total Pakistan		**46**	**5**	**27**	**30,714**	**127,414,398**	
PERU	BELCO	• Peña Negra, 1960	3,000- 8,500	26	160	57	12,597	93,406,872	38.0
		• Lobitos, 1960	3,500- 7,500	12	128	90	10,620	41,205,135	38.0
		• Litoral, 1955	1,500- 6,000	4	101	35	3,998	33,638,572	36.0-40.0
		• Providencia, 1967	3,000- 7,000	4	43	22	1,278	19,481,843	38.0-40.0
		Other	...	...	...	14	...	197,674	...
	OCCIDENTAL	• Bartra, 1979	8,000- 8,930	...	15	1	9,698	11,115,049	11.5
		• Capahuari Sur, 1973	11,800-12,900	...	16	10	18,209	117,689,191	35.6
		• Dorissa, 1978	9,800-10,600	...	9	3	9,577	24,771,325	34.0
		• Forestal, 1973	9,000- 9,900	...	7	3	5,635	26,375,878	26.7
		• Huayuri Sur, 1977	10,000-10,800	...	10	2	4,543	13,097,079	29.3
		• San Jacinto, 1978	7,200- 7,950	...	3	...	3,991	2,210,422	13.1
		• Shivyacu, 1973	9,100-10,100	...	16	2	14,215	41,602,311	20.8
		• Jibaro, 1974	10,110-11,155	...	6	...	3,497	3,227,489	11.3
		• San Jacinto, 1978	8,783- 9,760	...	15	3	8,339	16,617,071	23.5
		• Jibarito, 1981	9,650	...	4	1	6,758	3,964,431	10.8
		Other	...	...	1	7	941	1,458,677	...
	OCCIDENTAL/BRIDAS	Talara area*	1,343- 6,080	...	1,097	259	11,103	143,949,952	...
	PETROPERU	Talara-Lima area, 1869-1905	2,000- 9,000	169	1,630	3,858	25,860	915,339,677	34.1
		Corrientes, 1971	10,000-12,600	6	26	5	32,717	62,340,208	29.8
		Pavayacu, 1972	9,600-11,300	...	14	...	4,188	12,063,371	30.2
		Nueva Esperanza, 1980	10,200-10,700	1	2	2	1,220	3,232,979	44.0
		Yanayacu, 1974	11,400-13,600	...	7	2	1,295	2,424,769	19.1
		Capirona, 1972	9,800-12,000	...	4	1	1,169	684,344	25.3
		Valencia, 1975	10,500-11,200	...	1	2	229	407,084	44.0
		Other	...	5	30	22	746	24,734,572	...
*Secondary recovery project		**Total Peru**		**227**	**3,345**	**4,481**	**192,423**	**1,815,217,975**	
PHILIPPINES	OCCIDENTAL	• South Nido, 1977	6,660- 6,945	3	...	2	1,047	14,486,043	27.0
		• Matinloc, 1979	6,800	5	...	...	3,779	5,643,180	42.9
	AMOCO	• Cadlao, 1977	5,800	1	...	...	3,690	6,913,000	48.0
		Total Philippines		**9**	**...**	**2**	**8,516**	**27,042,223**	
QATAR[e]	BAPC	• Bul Hanine, 1970	6,000	14	...	1			35.0
		Dukhan, 1940	6,500	116	...	45			41.1
		• Idd El Shargi, 1960	4,500- 8,250	25	...	6	294,000	3,764,980,000	35.0
		• Maydan-Mahzam, 1963	7,000	19	...	5			38.0
		Total Qatar		**174**	**...**	**57**	**294,000**	**3,764,900,000**	
RAS al KHAIMAH	GULF	• Saleh	14,500	4	...	...	9,117	4,010,249	50.0
		Total Ras al Khaimah		**4**	**...**	**...**	**9,117**	**4,010,249**	
SAUDI ARABIA[e]	ARAMCO	Abqaiq, 1940	6,690						37.0
		Abu-Hadriya, 1940	9,340						35.0
		• Abu-Safah, 1963	6,600						30.0
		• Berri, 1964	8,300						32.0-34.0
		Dammam, 1938	4,800						35.0
		Fadhili, 1949	8,050						39.0
		Ghawar, 1948	6,920						34.0
		Harmaliyah, 1971	8,430						35.0
		Khurais, 1957	5,200	NA	NA	NA	3,227,000	50,296,130,000	33.0
		Khursaniyah, 1956	6,560						31.0
		• Manifa, 1957	7,950						29.0
		• Marjan, 1967	6,800						33.0
		• Qatif, 1945	7,100						33.0-34.0
		• Safaniyah, 1951	5,100						27.0
		• Zuluf, 1965	5,800						32.0
		Total Saudi Arabia		**NA**	**NA**	**NA**	**3,227,000**	**50,296,130,000**	
SHARJAH	CRESCENT	• Mubarek,[c] 1972	12,650-12,990	1	3	...	5,900	73,748,700	37.0
	AMOCO	Saaja,[c] 1980	10,200-12,300	15	...	...	60,201	46,478,746	50.0
		Moveyed[c]	...	...	...	...	...	...	...
		Total Sharjah		**16**	**3**	**...**	**66,101**	**120,227,474**	

	WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
SPAIN	SHELL ESPANA	• Amposta Manne North, 1970	10,000	2	...	1	1,500	54,269,246	37.0
	CHEVRON	• Casablanca, 1975	8,000	5	...	...	30,400	51,233,202	34.0
	AMOSPAIN	Ayo'uengo, 1964	4,000	...	32	8	1,613	13,197,000	37.0
	SHELL/CAMPSA	• Castellon B., 1972	9,000	3	...	...	6,000	13,888,162	35.0
	ENIEPSA	• Dorado, 1975	6,700	1	...	1	7,960	16,375,263	21.0
		• Salmonete, 1984	12,600	...	...	1	3,140	1,113,239	44.0
		• Angula, 1984	12,000	...	...	1	106	46,630	33.0
		Total Spain		**11**	**32**	**12**	**50,719**	**150,122,742**	
SURINAME	STAATSOLIE	Tambaredjo	984	...	23	2	1,040	565,693	15.8
		Total Surinam	**984**	**...**	**23**	**2**	**1,040**	**565,693**	**15.8**
SYRIA	S.P.C.	Alian, 1974	5,900	3	8	...	1,170	5,465,606	19.0
		Gbebeh, 1976	2,300	12	17	...	3,000	3,385,341	18.0
		Jebisseh, 1968	2,000- 3,300	23	112	...	7,630	21,649,169	18.0
		Karchok, 1968	6,500	3	83	...	24,700	123,554,790	20.0
		Rumilan, 1962	6,500	8	39	...	6,103	40,510,336	24.0
		Soudie, 1959	6,500	4	449	...	107,490	618,252,613	24.0
		Tichrine, 1976	2,600	4	16	...	2,555	3,044,838	18.0
		Other	...	6	60	...	9,035	14,268,964	...
		Total Syria		**63**	**784**	**...**	**161,683**	**830,149,657**	
THAILAND	UNION OIL	• Erawan, 1973	7,000	72	...	15	6,864	8,329,663	54.6
		• Baanpot, 1980	7,000	10	...	...	1,262	907,222	54.6
		• Platong, 1976	8,500	27	...	4	2,711	490,697	59.1
		• Satun, 1980	8,500	48	...	2	2,581	467,261	55.1
	THAI SHELL	Sirikit, 1981	5,258- 5,976	26	...	3	19,779	10,687,700	41.0
		Sirikit West, 1983	5,500	1	...	...	677	45,500	41.0
		Total Thailand		**194**	**...**	**24**	**33,874**	**20,938,043**	
TRINIDAD	AMOCO	• Teak, 1971	15,191	12	40	...	43,475	194,365,940	29.3
		• Samaan, 1971	11,780	9	26	...	18,040	161,404,624	36.8
		• Poui, 1974	11,650	11	18	...	22,971	127,251,807	34.0
		• Cassia, 1973	12,700	6	...	...	8,915	4,426,562	45.0
	T.N.A.	• Soldado, 1955	11,000	60	254	...	37,618	428,210,576	24.8
		Fortin Offshore (FOS), 1954	...	2	11	...	335	6,740,594	...
	TRINIDAD-TESORO	Palo Seco/Erin/McKenzie, 1926	12,718	39	461	...	8,091	108,934,506	20.2
		Fyzabad/Apex/Quarry, 1920-38	11,000	8	321	...	4,135	166,973,836	21.5
		Coora/Quarry, 1936	14,000	5	197	...	2,544	89,318,074	23.8
		• Galeota, 1963	6,304	...	48	...	4,199	12,239,836	25.5
		Other	...	21	332	...	4,660	64,893,324	...
	TEXACO	• Brighton, 1908	700- 7,500	5	61	...	464	72,034,891	32.8
		Barrackpore, 1911	1,300-11,100	9	34	...	1,126	28,845,987	29.9-41.2
		Guayaguayare, 1902	500-10,750	1	138	...	1,452	85,008,808	33.7
		Forrest Reserve, 1913	500-11,000	...	...	...	10,608	256,103,731	23.0
		Oropouche, 1944	2,700- 9,100	1	28	...	220	6,472,979	38.6
		Palo Seco, 1929	250-12,700	11	72	...	1,960	91,158,811	21.2
		Trinity, 1956	1,400- 9,700	...	15	...	266	14,934,230	32.2
		Other	...	14	307	...	375	56,877,959	...
	TRINTOC	Area IV & Guapo, 1913	10,626	17	47	...	1,334	37,523,367	25.5
		Parrylands, 1913-18	10,626	21	76	...	1,680	38,166,255	30.2
		Point Fortin C & W, 1907-16	10,626	30	95	...	2,678	38,413,421	22.0
		Point Fortin E., 1929	11,000	2	52	...	1,028	25,895,074	22.2
		Penal, 1936	11,067	17	64	...	1,321	61,050,163	22.4
		Catshill, 1950	9,693	1	36	...	391	22,702,812	38.3
		Other	...	14	26	...	910	42,449,415	...
	P.C.O.L.	All fields	...	3	79	...	520	19,909,091	...
		Total Trinidad		**319**	**2,838**	**...**	**181,266**	**2,262,306,873**	
TUNISIA	ELF-ETAP*	• Ashtart	10,500	6	8	1	22,490	150,100,000	29.8
	ELF-Serept†	Douleb/Semmama	1,500- 2,500	...	14	...	908	16,800,000	39.3
		Tamesmida	2,500	...	3	...	278	1,800,000	36.8
	CFTP	Sidi El Itayem, 1971	7,500- 7,800	...	16	2	2,941	18,753,000	44.0
		Other	...	...	...	...	...	655,000	...
	PETROFINA/AGIP/ETAP	Laarich, 1979	8,031	1	...	...	143	166,917	43.3
		Makhrouga, 1980	7,893	3	...	...	2,357	1,463,500	45.5
		Debbech, 1980	8,202	1	...	...	131	151,784	43.4
	SHELL/AGIP/ETAP	• Tazerka, 1979	4,111- 4,232	4	...	...	7,176	8,504,075	30.0
	AGIP-TUNISIA (Sitep)	El Borma, 1964	8,250- 8,900	49	34	15	73,779	430,611,743	42.5
		Chouech es Saida, 1971	12,600	1	...	...	382	2,085,717	42.9
		Total Tunisia		**65**	**75**	**18**	**110,585**	**631,001,736**	

*Elf Aquitaine Tunisie-ETAP. †Elf Aquitaine Tunisie-Serept.

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
TURKEY	TURKISH SHELL	Barbes, 1971	...	...	14	2	1,675	14,005,174	29.7
		Beykan, 1964	...	...	28	4	3,489	55,580,835	33.2
		Kayakoy, 1960	...	...	15	5	1,680	18,105,430	38.2
		Kayakoy West, 1964	...	...	13	4	2,126	26,576,986	34.7
		Sahaban, 1965	...	...	9	4	396	12,362,967	34.5
		Malatepe, 1970	...	...	11	...	1,070	6,139,301	32.7
		Kurkan, 1963; and Kurkan S., 1965	...	...	24	2	3,109	52,270,583	31.4-34.5
		Sincan, 1979	...	...	6	...	581	1,973,960	31.4
		Yatir East, 1973	...	...	4	6	674	4,569,824	30.9
		Yenikoy East, 1974	...	...	2	...	324	3,494,232	31.3
		Other	...	...	4	2	491	5,401,871	...
	MOBIL	Selmo, 1964	5,800	1	18	1	5,617	60,749,000	34.2
		Bulgurdag	4,500	...	...	...	...	2,400,000	...
	TPAO	Raman, 1940	4,500	...	95	6	4,707	44,280,457	18.7
		Bati Raman, 1961	4,200	...	69	5	1,826	31,875,053	13.3
		Garzan, 1956	4,700	...	19	1	1,081	31,651,915	26.2
		Germik, 1968	6,500	...	4	...	117	2,930,583	18.8
		Mağrip, 1961	5,700	...	12	1	305	14,194,709	18.4
		Silivanka, 1962	8,200	...	10	...	788	6,854,371	23.0
		Beycayir, 1976	7,700	...	1	...	43	146,886	26.1
		Celikli, 1964	10,500	...	4	...	394	923,200	35.2
		Sezgin, 1970	5,600	...	...	...	...	87,559	17.0
		Oyuktas, 1972	7,600	...	...	...	...	592,005	31.0
		Devecatak, 1973	4,800	...	1	...	40	196,047	37.0
		Kuzey Osmancik, 1971	3,800	...	2	...	314	1,784,650	37.6
		Adiyaman, 1971	5,800	...	12	2	372	7,448,185	27.6
		Güney Adiyaman, 1977	5,000	...	...	...	...	115,836	20.4
		Kuzey Adiyaman, 1977	9,500	...	1	...	5	58,957	32.0
		Bölükyayla, 1977	10,300	...	...	...	...	167,663	35.0
		Saricak, 1973	5,250	...	4	...	210	2,329,105	31.5
		Güney Saricak, 1973	5,250	...	6	1	248	3,343,730	31.5
		Yenikôy, 1973	6,400	...	10	1	975	7,313,839	31.4
		Güney Kayaköy, 1976	8,600	...	2	1	152	1,674,410	30.4
		Sivritepe, 1977	8,200	...	1	...	32	456,434	33.4
		Camurlu, 1976	5,600	...	5	1	115	569,686	12.2
		Ikiztepe, 1976	4,900	...	...	...	...	88,051	11.3
		Güney Sahaban, 1978	5,450	...	6	...	484	1,474,856	33.2
		Güney Dincer, 1981	5,350	...	17	1	1,328	3,478,508	16.7
		Selmo B., Selmo, 1981	5,500	...	2	...	213	274,864	34.0
		Mehmetdere, 1982	6,700	...	1	...	35	141,475	31.0
		Kartaltepe, 1982	6,550	...	3	...	391	435,260	32.0
		Cemberlitas, 1983	9,500	...	10	...	4,936	2,104,062	30.5
		Alcik	6,500	...	1	...	24	27,908	32.0
		Cukurtas, 1985	...	...	1	...	400	36,694	36.0
		B. Kozluca, 1985	...	...	1	...	80	2,023	12.0
	ERSAN[9]	Kahta, 1958	3,500	...	...	...	...	3,945,805	11.5
		Total Turkey		**1**	**448**	**50**	**40,847**	**434,544,848**	
UNITED KINGDOM	AMOCO	• Montrose, 1969	8,200	6	9	1	14,014	63,678,713	40.5
		• NW Hutton, 1975	12,000	5	12	...	50,483	41,070,486	36.0
	*BPPD (UK LAND)	Wytch Farm, Bridport Sands, 1974	2,910	...	8	4	3,044	5,977,000	37.0
		Wytch Farm, Sherwood Sandstone, 1977	5,115	1	1	4	1,904	2,269,000	38.0
	BRITOIL	• Thistle, 1973	9,000	28	...	4	76,631	260,628,566	38.0
		• Beatrice A, 1976	6,750	15	16	1	38,825	46,636,110	39.0
		• Beatrice B	6,500	7	7	...	18,824	6,385,355	39.5
		• Deveron, 1972	9,000	2	...	...	6,008	1,639,532	38.2
	BP	• Forties, 1970	7,000	43	...	12	414,900	1,498,600,000	37.0
		• Buchan, 1974	8,700	6	...	2	39,000	38,460,000	33.0
		• Magnus, 1974	9,500	9	...	...	124,800	78,000,000	39.0
		East Midlands, 1939	3,500	2	66	67	2,014	24,030,000	36.0
		Kimmeridge, 1960	1,800	...	1	2	144	2,700,000	40.0
	CHEVRON	• Ninian, 1974	10,000	50	1	9	213,000	588,000,000	35.0
	CONOCO GROUP	• Statfjord, 1974	9,500	41	...	...	78,341	89,032,000	38.0
		• Murchison, 1975	9,900	14	...	...	60,241	133,140,000	39.0
		• Dunlin, 1973	9,200	19	...	...	5,360	20,307,000	36.0
		• Hutton, 1973	10,000	10	...	...	11,300	3,897,000	33.0
	HAMILTON BROS.	• Argyll, 1971	9,000- 9,400	7	...	...	9,400	54,700,000	38.0
		• Duncan, 1980	9,400-10,000	5	...	...	14,700	9,000,000	36.0
		• Innes, 1983	12,000-12,300	1	...	...	3,700	673,000	45.0
	MARATHON	• North Sea (Brae) South, 1975	12,700-13,437	7	...	...	88,490	53,034,441	35.0
	MOBIL	• Beryl, 1972	9,900-11,500	23	11	5	97,966	267,764,779	37.4
	OCCIDENTAL	• Claymore, 1974	8,100	1	21	2	82,812	237,858,000	29.5
		• Piper, 1973	8,100	12	12	...	183,630	652,777,000	37.2
		• Scapa, 1981	8,100	...	...	2	...	751,000	32.0
	SHELL	• Auk, 1970	NA	10		1	9,221	67,095,808	37.0
		• Brent, 1971	NA	54		12	439,843	739,803,028	38.0
		• Cormorant, 1972	NA	7		6	36,222	51,432,224	36.0
		• Cormorant N., 1974	NA	10		1	100,625	79,039,639	34.9

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to Jan. 1, 1985	°API gravity
		• Dunlin A, 1973	NA		20	4	55,450	210,922,601	33.0
		• Fulmar, 1975	NA			12	129,138	133,126,452	34.0
	PHILLIPS	• Maureen (North Sea), 1973	8,000- 8,700	12		2	77,265	48,045,956	36.0
	TEXACO NORTH SEA	• Tartan, 1974	10,217-12,614	6	2	2	27,200	34,100,000	37.0-42.0
*BP Petroleum Development Ltd. took operatorship of Wytch Farm field from BGC in May 1984.		• Highlander, 1976	8,759- 9,372	2			18,300	3,300,000	34.0-37.0
	UNION OIL	• Heather, 1973	10,800	3	22	1	22,925	56,050,678	33.9
		Total United Kingdom		627		198	2,595,700	5,603,625,368	
VENEZUELA	PDV/ ANZOA-TEGUI	Boca, 1971	9,500	7	8	70	1,754	76,425,154	33.0
		Caico Seco, 1946	6,500- 7,300	8	6	88	3,071	64,798,609	37.3
		Chimire, 1948-52	7,000- 7,200	29	22	147	6,041	366,923,883	36.0
		Dacion, 1957	6,700	3	79	61	8,345	215,588,550	21.3
		Elias, 1954	5,000- 6,470	36	35	94	7,941	114,136,952	36.6
		El Roble, 1939	9,500-11,500	20		40	2,359	40,950,575	51.3
		Guara, 1946	5,000-10,000	14	135	212	12,910	557,340,255	26.0
		Inca, 1948	7,250	10	7	33	1,888	30,619,850	32.9
		Leona, 1938	2,200-12,800	11	83	210	9,269	186,968,522	21.4
		La Ceiba, 1946	9,450	18	5	13	2,647	45,379,505	43.8
		Mata, 1954	8,970-10,516	45	27	333	10,667	501,776,684	34.1
		Merey, 1937	5,400- 5,700	8	118	482	4,774	242,288,685	11.4
		Nipa, 1945	6,000- 8,500	14	24	262	13,173	501,135,215	29.5
		Oscurote-Norte, 1952	9,513	4	12	60	665	121,561,918	22.1
		Oficina, 1937	5,900	14	138	332	18,979	771,383,588	21.6
		Soto, 1950	9,500	6		21	2,553	180,601,271	38.9
		Sta. Ana, 1936	8,500	63	2	43	5,605	116,757,853	44.3
		San Joaquin, 1939	6,550	44		54	5,441	88,915,745	53.2
		Sta. Rosa, 1941	8,500	135	5	62	16,434	383,419,995	48.4
		Yopales, 1937	4,600	7	102	145	13,760	151,681,617	22.2
		Zamas, 1958	13,270	7	1	8	2,364	34,684,665	35.4
		Zapatos, 1955	11,500	17	5	45	4,041	141,085,848	37.0
		Zorro, 1953	11,100	6	4	20	2,467	69,697,530	28.3
		Zulia, 1957	12,710	5	5	12	1,035	22,763,437	39.8
		Zumo, 1954	9,200	3	2	31	831	79,226,943	17.9
		La Ceibita, 1963	9,878	17	6	23	4,135	78,717,760	41.3
		Adjuntas, 1957	5,000			53	145	10,597,009	13.9
		Other	...	141	219	793	46,664	529,265,351	
	PDV/MONAGAS	Acema, 1960		13	17	28	33,866	90,186,099	23.9
		Aguasay, 1955	8,100-13,400	5	3	32	7,448	110,190,800	41.7
		Jobo, 1956	3,600- 4,000	...	202	212	44,526	237,332,929	12.0
		Morichal, 1958	3,312	...	35	160	5,444	166,170,377	10.6
		Orocual, 1953	2,954	5	18	27	3,656	26,078,371	27.0
		Oritupano, 1950	7,657	...	...	65	5,017	171,805,429	22.8
		Pirital, 1958	450- 1,100	...	51	27	1,653	26,556,036	17.0
		Quiriquire, 1928	7,000- 7,200	...	39	434	3,680	758,866,291	16.3
		Sta. Barbara, 1941	5,020- 6,500	6	36	274	1,349	166,278,090	29.8
		Tacat, 1953	1,820- 3,670	...	43	90	1,395	44,666,697	17.0
		Temblador, 1936	3,500- 4,500	...	18	28	1,488	108,179,096	19.2
		Other	...	72	212	749	49,353	622,113,712	...
	PDV/ZULIA	Boscan, 1946	...	...	272	197	54,554	697,748,058	10.2
		Bachaquero, 1930	...	25	1,064	2,687	227,747	6,139,672,583	20.2
		Cruces-Manueles, 1916	3,000- 8,000	2	25	105	1,242	173,726,881	30.9
		Cabimas, 1917	2,200	8	392	817	34,870	1,545,820,908	23.4
		Centro, 1959	9,600-11,000	31	78	64	83,742	740,647,050	35.6
		La Concepcion, 1953	3,148- 8,000	2	61	99	3,936	132,606,595	35.1
		La Paz, 1925	4,268- 8,000	9	53	94	12,993	844,394,606	30.5
		Lago, 1959	11,450	30	5	36	13,886	215,099,060	31.7
		Lagunillas, 1926	3,000	76	2,034	3,136	352,887	10,367,858,361	21.5
		Lama, 1957	8,320	116	96	168	104,941	2,412,856,942	32.8
		Lamar, 1958	13,000	35	46	98	65,637	1,050,240,444	34.5
		Mara, 1945	5,240	14	145	275	2,633	405,451,396	22.0
		Mene Grande, 1914	4,130	...	304	296	6,664	629,106,670	18.4
		Motatan, 1952	...	6	22	2	16,131	55,730,514	20.3
		Sibucana, 1948	13,450	...	1	2	668	42,963,342	32.2
		Tia Juana, 1928	3,000	10	2,012	1,035	186,022	3,765,699,507	17.9
		Urdaneta, 1970	10,000	9	125	128	48,492	96,450,732	23.3
		West-Tarra, 1942	4,250- 5,500	8	7	28	1,808	69,934,768	41.3
		Other	...	51	107	249	52,270	458,255,258	...
	PDV/BARINAS	Hato, 1965	9,550	1	12	5	2,306	41,152,181	27.3
		Maporal, 1957	10,950	...	1	12	2,454	12,024,669	28.9
		Paez, 1963	NA	...	26	38	10,067	53,412,504	20.2
		Silvan, 1949	10,860	1	9	8	3,337	45,213,593	29.3
		Silvestre, 1948	8,860	...	21	27	4,562	132,951,879	25.3
		Sinco, 1953	8,500- 9,100	1	50	33	11,465	249,100,284	24.0
		Other	...	3	126	146	826	4,797,347	...
	PDV/FALCON	All fields	...	...	10	125	224	107,951,582	24.7
	PDV/GUARICO	Budare, 1958	4,523	7	3	70	3,351	65,495,209	31.5
		Las Mercedes, 1942	4,500	2	24	158	583	133,009,569	22.8
		Ruiz, 1949	4,500	...	7	35	319	33,063,625	32.0
	PDV/AMACURO	Tucupita	...	3	...	64	665	66,861,223	16.6
		Total Venezuela		1,243	8,860	16,110	1,680,105	39,052,413,236	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells: Flow	Artificial lift	Shut-in	Bbl average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
WEST GERMANY	**BAVARIA**	Arlesried, 1964	4,900				698	12,564,281	47.0
		Moenchsrot, 1958	4,800		120		346	11,278,705	36.0
		Other	...				3,870	33,352,923	...
	EMSLAND	Emlichheim, 1964	2,600				3,654	41,341,920	25.0
		Georgsdorf, 1944	1,800- 2,600				7,031	96,609,848	24.0-29.0
		Meppen-Schwefingen, 1960	4,000				1,042	11,490,388	28.0-30.0
		Ruehlermoor, 1949	2,000- 4,700		1,121		10,033	131,416,564	28.0-30.0
		Ruehlertwist, 1949	2,350- 2,900				1,755	29,793,409	25.0
		Scheerhorn, 1949	3,550- 3,750				3,072	48,109,899	30.0
		Other	...				1,631	29,493,518	...
	SCHLESWIG-HOLSTEIN	Ploen-Ost, 1959	6,400				34	47,671,250	36.0
		Preetz, 1962	8,350- 8,550		212		416	10,571,234	29.0
		Reitbrook, 1937	1,450- 2,100				1,726	37,425,867	29.0
		Other	...				7,033	52,026,904	...
	HANOVER	Eldingen, 1949	4,750				830	18,585,173	35.0
		Hankensbuettel, 1954	4,450- 5,100				4,573	89,559,879	33.0
		Hardesse, 1958	4,300- 5,900				752	8,951,960	34.0
		Hohne, 1958	4,300- 5,900		845		884	38,207,015	33.0-34.0
		Knesebeck, 1958	5,100- 5,200				1,314	17,206,219	36.0
		Leiferde, 1956	2,600				635	19,771,030	34.0
		Lueben, 1955	3,950				821	10,968,758	35.0-38.0
		Meckelfeld, 1938	1,000- 1,300				350	13,839,326	24.0-32.0
		Oelheim-Sued, 1968	7,650				693	6,662,992	33.0
		Orrel-Wesendorf-Nord, 1954	4,450				1,362	12,019,840	...
		Ruehme, 1954	1,950				797	9,251,239	...
		Sinstorf, 1960	6,750- 7,150				764	18,014,124	...
		Suderbruch, 1949	3,750- 7,550				674	22,262,262	19.0-38.0
		Vorhop, 1952	2,950- 6,900				1,082	15,724,904	36.0
		Other	...				3,473	221,495,167	...
	UPPER RHINE VALLEY	Landau, 1955	3,950- 4,800				1,210	24,078,610	36.0
		Other	...		129		1,206	12,276,476	...
	WESER-EMS	Barenburg, 1953	2,300- 3,300				2,702	34,766,874	29.0
		Bockstedt, 1954	3,750				1,302	19,434,920	...
		Bramberge, 1958	2,560- 3,300				5,994	90,054,928	29.0
		Dueste, 1954	2,600- 4,250				1,523	39,956,611	...
		Gross Lessen, 1969	3,300		725		1,100	20,711,641	...
		Sued-Oldenburg, 1950	1,700- 6,500				1,473	37,996,405	...
		Voigtei, 1953	1,150- 1,500				850	23,615,019	31.0-34.0
		Wehrbleck, 1947	3,400				858	15,153,622	33.0
		Other	...				1,938	30,513,545	...
		Total West Germany			*3,152		81,501	1,484,225,253	
ZAIRE	**GULF OIL**	• GCO, 1970	7,000- 9,000	7	...	...	660	5,844,350	29.0
		• Mibale, 1973	5,000- 6,000	7	...	...	16,950	67,517,900	30.0
		• Mwambe, 1979	6,150	...	...	2	22	445,262	30.4
		• Motoba, 1976	11,098	...	...	1	6	122,582	44.3
		Lukami, 1983	12,400	3	...	...	7,300	2,437,125	35.0
		Libwa, 1981	5,500	...	...	2	...	...	...
		Total Zaire		17	...	5	24,938	76,358,219	

*As of Jan. 1, 1985.

USSR

Field, year discovered	No. wells	1985 prod. (million bbl)	Cum. prod. 1-1-86 (million bbl)	Pay, ft.
Artan, 1955	3,000	54	2,346	Carb., 4,429
Baku Archipelago, 1963	210	20	431	Pliocene, 6,773
Fedorovskoye, 1971	1,500	260	1,866	L. Cret., 5,900
Kholmogorskoye, 1973	650	70	357	L. Cretaceous
Kotur-Tepe, 1956	280	28	1,528	Pliocene, 8,793
Mamontovo, 1965	1,500	210	1,819	Cret'ous, 6,300
Neftianye Kamni, 1949	1,200	19	1,082	Pliocene, 5,406
Pravdinsk, 1964	500	53	826	L. Cret., 9,580

Field, year discovered	No. wells	1985 prod. (million bbl)	Cum. prod. 1-1-86 (million bbl)	Pay, ft.
Romashkino, 1948	8,000	340	13,430	Devonian, 5,791
Samotlor, 1965	4,700	1,025	11,800	L. Cret., 7,316
Sovetskoye, 1962	300	45	839	Cret., 11,130
Usa, 1963	1,200	95	847	Paleozoic, 6,510
Ust-Balyk, 1961	1,000	76	1,516	L. Cret., 8,845
Uzen, 1961	2,000	70	1,490	Jurassic, 2,667
Yuzhno-Surgut, 1973	500	76	529	L. Cret.
Zapadno-Surgut, 1962	250	25	529	Cret., 7,628

U.S. fields with reserves exceeding 100 million bbl

State Field	Disc. date	1985 prod.	Cum. prod. 1-1-86	Est. rem. reserves	Est. No. wells
			1,000 bbl		
ALABAMA					
Citronelle	1955	2,105	141,954	12,900	446
ALASKA					
Endicott	1981*	—	—	375,000	—
Granite Point	1965	3,012	100,089	19,890	27
Kuparuk River	1969	79,484	189,067	1,400,516	248
Lisburne	1968**	—	—	325,000	—
McArthur River	1965	7,548	506,498	47,133	51
Middle Ground Shoal	1963	3,060	146,903	11,705	40
Milne Point	1969***	700	700	100,000+	20
Prudhoe Bay	1968****	568,212	4,365,059	5,101,761	499
Seal Island	1983*****	—	—	300,000+	—
Swanson River	1968	2,172	202,894	13,750	36
ARKANSAS					
Smackover	1922	3,986	547,226	16,000	2,160
CALIFORNIA					
San Joaquin Valley					
Belridge South	1911	53,059	487,482	263,793	4,626
Buena Vista	1909	1,970	644,602	14,871	1,166
Coalinga	1890	11,195	722,799	62,274	2,228
Coalinga Nose	1938	1,565	494,367	13,317	76
Coles Levee North	1938	584	159,078	7,677	90
Cuyama	1949	603	216,644	8,500	124
Cymric	1909	6,051	176,954	35,000	946
Edison	1928	1,349	130,151	33,811	780
Elk Hills	1911	47,052	774,275	700,000	1,247
Fruitvale	1928	969	112,972	7,747	368
Greeley	1936	243	111,834	1,642	39
Kern Front	1912	2,957	168,161	18,960	1,045
Kern River	1899	50,622	1,066,790	919,378	6,254
Kettleman North Dome	1928	236	456,087	835	57
Lost Hills	1910	4,908	162,720	75,000	1,674
McKittrick	1896	4,076	257,824	21,308	1,195
Midway-Sunset	1894	53,635	1,705,755	450,000	9,235
Mount Poso	1926	6,523	240,994	53,881	536
Rio Bravo	1937	216	115,627	983	19
Coastal Area					
Cat Canyon E. & W.	1908	4,736	278,739	56,262	792
Dos Cuadras	1969	5,594	198,512	55,649	145
Elwood	1928	383	104,649	1,292	7
Hondo	1969*	12,758	58,404	142,242	22
Orcutt	1901	1,138	163,047	13,065	177
Point Arguello	1981**	—	—	500,000	—
Point Pedernales	1982***	—	—	350,000	—
Rincon	1927	1,395	144,440	8,046	249
San Ardo	1947	8,017	391,517	138,310	716
Santa Maria Valley	1934	2,3[illegible]	192,321	46,306	203
South Mountain	1916	[illegible]	143,718	14,313	378
Ventura	1919	7,4[illegible]	872,462	118,564	566
Los Angeles Basin					
Beta	1976****	6,205	19,283	194,395	48
Beverly Hills	1900	2,801	115,933	18,362	124
Brea Olinda	1880	2,490	377,107	63,000	733
Coyote East	1909	674	106,832	3,537	136
Coyote West	1909	1,016	247,405	3,632	137
Dominguez	1923	714	267,395	5,422	125
Huntington Beach	1920	8,298	1,047,147	71,793	997
Inglewood	1924	3,482	336,328	57,311	395
Long Beach	1921	2,969	901,498	25,192	454
Montebello	1917	417	190,905	2,586	152
Richfield	1919	1,679	183,701	7,811	236
Santa Fe Springs	1919	1,049	609,957	8,715	166
Seal Beach	1924	1,227	199,679	3,700	179
Torrance	1922	2,346	208,000	6,220	375
Wilmington	1932	41,290	2,193,118	358,710	2,172
COLORADO					
Rangley	1933	12,507	703,682	30,000	545
FLORIDA					
Jay	1970	6,854	346,188	70,346	115
ILLINOIS					
Clay City	1938	3,400	385,088	5,100	2,615
Lawrence	1906	2,770	384,458	4,901	2,700
Louden	1938	1,755	383,860	3,500	1,340
Main	1906	2,075	227,463	4,000	3,356
New Harmony	1939	926	150,273	1,800	1,140
Salem	1938	2,700	380,740	4,200	1,325
KANSAS					
Bemis-Shutts	1928	1,508	240,652	6,000	887
Chase-Silica	1931	1,359	266,481	5,800	1,098
Eldorado	1917	1,329	293,052	5,600	834
Hall-Gurney	1931	1,351	142,228	6,500	1,132
Trapp	1937	1,496	222,131	6,400	993
LOUISIANA					
Onshore South					
Bay de Chene	1941	504	95,414	18,920	45
Bay St. Elaine	1928	300	163,556	26,544	51
Bayou Sale	1941	1,176	158,986	5,800	18
Black Bay, West	1953	1,800	138,079	17,152	86
Caillou Island	1930	2,676	594,619	81,632	193
Cote Blanche Bay, West	1940	700	179,533	48,435	160
Delta Farms	1944	192	114,626	7,744	23
Garden Island Bay	1934	1,764	216,435	36,783	165
Golden Meadow	1938	876	133,021	6,708	220
Grand Bay	1938	648	168,819	5,455	73
East Hackberry	1927	948	106,256	10,434	60
West Hackberry	1928	2,076	135,678	12,709	124
Iowa	1931	168	95,733	605	24
Jennings	1901	456	115,362	1,475	146
Lafitte	1935	2,232	250,071	14,783	177
Lake Barre	1929	996	200,864	23,250	65
Lake Pelto	1929	540	115,245	19,170	40
Lake Washington	1931	2,004	234,685	24,081	100
Leeville	1931	540	139,617	9,250	49
Paradis	1939	1,020	123,674	11,174	34
Quarantine Bay	1937	1,176	170,326	4,000	65
Timbalier Bay, Onshore	1938	948	269,575	26,357	114
Venice	1937	828	179,287	10,182	62
Vinton	1910	468	135,807	1,615	116
Weeks Island	1945	1,116	222,900	24,395	47
West Bay	1940	1,848	223,256	21,345	127
NORTH					
Caddo-Pine Island	1905	3,480	349,239	14,000	9,200
Delhi	1944	1,272	208,901	37,457	116
Haynesville	1921	1,368	165,610	5,000	302
Homer	1919	400	97,082	3,201	117
Rodessa	1935	230	105,246	2,287	65
Offshore					
Bay Marchand Blk. 2	1949	7,000	578,868	71,732	171
Eugene Island Blk. 330	1930	10,955	242,106	82,894	172
Grand Isle Blk. 16	1948	3,062	256,021	93,353	48
Grand Isle Blk. 43	1956	5,872	255,515	102,185	146
Main Pass Blk. 306	1969	2,603	195,585	84,619	105
Main Pass Blk. 41	1957	2,885	229,123	32,115	130
Main Pass Blk. 69	1948	4,000	229,000	93,000	45
Mississippi Canyon Blk. 194	1980	20,000	88,182	105,000	49
Mississippi Canyon Blk. 397		—	—	100,000	—

*Scheduled to begin production of 100,000 b/d of oil in 1987. **Scheduled to begin production of 100,000 b/d of oil in late 1986. ***Started up 10,000 b/d of oil output in November 1985, reaching 30,000 b/d at yearend. ****Includes about 14.75 million bbl of condensate. *****Still being delineated for commerciality. Oil in place estimated at about 1 billion bbl. Start-up of 100,000 b/d oil output by 1992 possible.

*Western portion of field still to be developed. **Platforms Hermosa and Harvest installed. First production due this year. ***Platform Irene installed. First production due this year. ****Further development under way, which could boost reserves recovery to 300 million bbl of oil.

State Field	Disc. date	1985 prod.	Cum. prod. 1-1-86	Est. rem. reserves	Est. No. wells
			1,000 bbl		
Ship Shoal Blk. 204,	1968	1,662	60,828	44,172	38
Ship Shoal Blk. 207,	1967	2,080	83,437	43,302	50
Ship Soal Blk. 208,	1962	5,000	147,092	78,351	68
South Pass Blk. 24,	1950	5,000	455,540	35,000	390
South Pass Blk. 27,	1954	2,551	119,494	79,021	180
South Pass Blk. 61,	1968	13,031	124,516	50,484	150
South Pass Blk. 62,	1965	3,020	98,094	89,865	68
South Pass Blk. 65,	1969	1,958	90,871	99,256	49
South Pass Blk. 65,	1969	1,958	90,871	99,256	49
South Timbalier Blk. 21,	1939	4,262	209,634	53,738	71
South Timbalier Blk. 135,	1956	1,826	135,831	29,169	49
West Delta Blk. 30,	1949	10,009	423,467	69,991	168
West Delta Blk. 73,	1962	2,500	177,088	97,902	64
MICHIGAN					
Albion-Scipio,	1957	—	120,000	—	—
MISSISSIPPI					
Baxterville,	1944	4,424	229,383	15,576	311
Heidelberg,	1944	3,691	161,048	14,309	313
Tinsley,	1939	1,202	216,814	4,000	179
MONTANA					
Bell Creek,	1967	1,555	127,307	26,333	204
Cut Bank,	1926	990	159,393	40,171	634
Pine,	1951	1,474	100,832	9,984	99
NEW MEXICO					
Denton,	1949	800	136,439	3,263	130
Empire-Abo,	1957	2,172	214,860	55,140	190
Eunice-Monument,	1929	3,084	116,962	19,346	1,000
Hobbs,	1928	6,651	273,748	25,000	410
Maljamar,	1926	2,023	139,239	10,792	760
Vacuum,	1929	16,081	392,214	46,000	1,090
NORTH DAKOTA					
Beaver Lodge,	1951	1,556	106,185	—	157
Four Eyes,	1978	191	4,662		114
Big Stick,	1979	1,966	30,582	59,385	55
T-R,	1978	1,197	11,252		65
OKLAHOMA					
Burbank,	1920	1,913	531,657	12,037	1,069
Eola-Robberson,	1947	1,110	130,444	10,890	603
Fitts,	1933	3,251	182,936	10,000	586
Glenn Pool,	1905	1,110	324,320	6,300	767
Golden Trend,	1945	5,472	444,709	25,000	1,252
Healdton,	1913	1,863	335,914	14,760	983
Hewitt,	1919	2,553	265,733	21,054	1,005
Oklahoma City,	1928	539	739,947	7,961	173
Postle,	1960	1,535	103,504	18,504	232
Sho-Vel-Tum,	1914	18,992	NA	82,008	7,810
Sooner Trend,	1965	5,379	289,598	24,000	5,103
TEXAS					
District 2					
Greta,	1933	1,254	145,178	14,922	136
Lake Pasture,	1953	2,520	76,388	19,040	184
Tom O'Connor,	1934	19,212	714,176	86,824	765
West Ranch,	1938	3,438	370,974	13,062	366
District 3					
Anahuac,	1935	2,136	281,184	18,816	125
Conroe,	1931	8,100	714,043	46,900	322
Giddings,	1971	32,746	246,602	180,000	2,505
Hastings,	1934	5,580	686,661	83,340	307
Magnet Withers,	1936	2,412	105,560	6,588	170
Oyster Bayou,	1941	1,512	157,648	20,652	45
Thompson,	1931	5,184	460,708	39,192	234
Tomball,	1933	720	119,644	11,280	113
Webster,	1937	5,532	556,704	20,468	173
District 5					
Van,	1928	5,436	511,976	20,000	382
District 6					
East Texas,	1930	48,465	4,881,842	1,115,663	10,626
Fairway,	1960	3,780	184,248	26,220	99
Hawkins,	1940	13,692	792,192	70,000	502
Neches,	1953	2,076	98,964	10,924	149
Quitman,	1948	2,100	115,916	13,900	216
District 8					
Andector,	1946	3,216	174,580	10,964	64
Block 31,	1945	5,496	208,652	20,000	285
Cowden, N.,	1930	15,648	447,388	60,000	1,280
Cowden, S., Foster, Johnson,	1932	10,236	471,396	35,000	1,579
Dollarhide,	1945	2,568	186,640	13,860	178
Dune,	1938	3,156	173,904	18,960	839
Fullerton,	1942	7,200	325,184	27,800	779
Goldsmith,	1934	8,760	732,580	50,720	2,231
Howard Glasscock,	1925	5,628	387,468	28,372	2,290
Iatan, E.,	1926	4,104	133,116	16,000	1,206
Jordan,	1937	1,224	126,120	5,080	297
Keystone,	1930	2,388	307,080	15,380	972
McElroy,	1926	9,396	443,205	70,000	2,146
Means,	1934	6,684	208,306	28,000	697
Midland Farms,	1944	3,648	226,848	26,352	318
Sand Hills,	1931	3,612	239,423	30,388	1,740
TXL,	1944	1,344	257,732	6,948	628
Waddell,	1927	924	98,600	6,400	197
Ward Estes, N.,	1927	4,476	353,713	20,524	1,631
Yates,	1926	44,892	1,058,958	895,547	865
District 8-A					
Anton-Irish,	1944	4,896	164,004	36,096	35
Cogdell Area,	1949	2,304	262,560	46,672	112
Diamond M,	1948	2,808	233,286	22,192	485
Kelly-Snyder,	1948	19,296	1,195,370	154,630	1,011
Levelland,	1938	18,912	431,848	50,000	2,863
Prentice,	1951	4,320	144,320	21,680	401
Salt Creek,	1950	6,888	222,860	37,032	149
Seminole,	1936	14,040	477,232	48,000	596
Slaughter,	1936	24,300	969,200	60,000	2,974
Spraberry Trend,	1951	21,396	587,400	60,000	6,651
Wasson,	1936	33,324	1,619,498	56,676	2,146
Welch,	1942	3,564	134,204	21,436	608
District 10					
Panhandle,	1921	10,512	1,398,866	65,660	12,342
UTAH					
Altamont-Bluebell,	1955	4,189	77,284	241,677	201
Aneth,	1956	5,652	337,957	40,000	470
Red Wash,	1951	1,981	121,759	16,759	224
Pineview,	1975	698	25,444	120,680	24
East Anschutz Ranch,	1979	12,222	33,677	770,788	9
WYOMING					
Brady,	1960	3,197	46,096	57,766	9
Byron,	1918	1,976	116,716	11,726	54
Elk Basin,	1915	3,582	493,285	34,636	191
Garland,	1906	2,635	146,999	8,000	247
Grass Creek,	1914	2,360	177,837	15,937	275
Hamilton Dome,	1918	3,042	259,095	8,000	254
Hartzog Draw,	1976	4,697	46,421	303,609	129
Hilight,	1969	697	73,738	57,510	115
Frannie,	1928	1,661	112,656	8,500	88
Lance Creek,	1918	118	107,557	600	31
Little Buffalo Basin,	1914	3,650	109,622	18,000	149
Lost Soldier,	1916	2,655	184,614	8,488	89
Oregon Basin,	1912	8,892	360,497	43,987	480
Painter Reservoir,	1979	6,873	35,304	91,038	40
Salt Creek,	1906	5,662	613,443	20,000	1,131
Whitney Canyon-Carter Creek,	1980	1,816	5,004	110,474	2

World well completions—1984

	Total wells	Oil	Gas	Dry
North America				
Canada	8,765	5099	1,865	1,801
U.S.A.	82,032	41,095	15,705	25,232
Latin America				
Argentina	126	25	9	92
Barbados	10	2	5	3
Belize	2	0	0	2
Bolivia	11	0	4	7
Brazil	963	669	21	273
Chile	81	53	2	26
Colombia	122	92	0	30
Ecuador	25	22	0	3
Mexico	268	172	32	64
Peru	150	118	2	30
Suriname	15	8	0	7
Trinidad-Tobago	151	135	5	11
Venezuela	406	399	0	7
North Africa				
Egypt	158	103	8	47
Libya	99	30	1	68
Morocco	6	0	2	4
Sudan	6	0	0	6
Tunisia	25	3	0	22
Other Africa				
Angola	29	3	0	26
Cabinda	32	2	0	30
Benin	2	0	0	2
Cameroon	74	67	1	6
Congo	39	3	0	36
Equatorial Guinea	1	0	1	0
Gabon	43	28	1	14
Ghana	2	0	2	0
Guinea Bissau	1	0	0	1
Ivory Coast	7	0	0	7
Liberia	1	0	0	1
Mauritania	1	0	0	1
Niger	2	0	0	2
Nigeria	89	78	2	9
Rep. of S. Africa	17	1	1	15
Somali	2	0	0	2
Tanzania	2	0	0	2
Togo	1	0	0	1
Zaire	42	36	0	6
Middle East				
Qatar	8	5	0	3
Abu Dhabi	132	93	1	38
Dubai	4	0	1	3
Sharjah	3	0	0	3
Ras al Khaimah	4	0	2	2
Oman	46	17	3	26
Syria	12	1	0	11
Turkey	40	18	0	22
North Yemen	3	1	0	2
Jordan	2	2	0	0
Kuwait	11	4	0	7
Israel	5	1	1	3
Europe				
Austria	49	21	13	15
France	127	82	3	42
Greece	6	0	0	6
Ireland	7	0	0	7
Italy	104	13	49	42
Netherlands	50	10	34	6
North Sea	141	68	39	34
U.K.	84	44	24	16
Norway	29	15	5	9
Holland	23	7	10	6
Denmark	4	2	0	2
Germany	1	0	0	1
Spain	23	7	1	15
Sweden	20	1	0	19
U.K.	25	14	1	10
West Germany	104	58	10	36
Yugoslavia	133	66	43	24
Far East				
Bangladesh	2	0	2	2
Brunei	61	47	0	14
Burma	260	253	3	4
India	185	156	0	29
Indonesia	756	560	0	196
Japan	38	20	0	18
Malaysia	103	87*	0	16
Pakistan	42	25*	—	—
Philippines	3	2	0	1
Taiwan	6	—	—	—
Thailand	115	91*	—	24
Oceania				
Australia	380	—	—	—
Papua New Guinea	5	0	0	5
New Zealand	19	2	2	15

*Oil/gas

Source: AAPG, API

World wildcat completion—1984

Courtesy API, AAPG

	Total	Oil	Gas	Dry
North America				
Western Canada	2,863	1,089	637	1,137
U.S.A.	15,077	2,421	1,500	11,156
Latin America				
Argentina	136	30	9	97
Barbados	10	2	5	3
Belize	1	0	0	1
Bolivia	3	0	0	3
Brazil	243	80	8	155
Chile	7	1	1	5
Colombia	42	20	0	22
Ecuador	3	0	0	3
Mexico	44	11	3	30
Peru	29	7	1	21
Suriname	3	0	0	3
Trinidad-Tobago	4	1	2	1
Venezuela	18	14	0	4
North Africa				
Algeria	3	1	0	2
Egypt	45	14	3	28
Libya	51	30	1	20
Morocco	5	0	0	5
Sudan	4	0	0	4
Tunisia	17	3	0	14
Other Africa				
Angola	10	3	0	7
Cabinda	3	2	0	1
Cameroon	6	1	1	4
Congo	5	3	0	2
Equatorial Guinea	1	0	1	0
Gabon	18	4	1	13
Ghana	2	0	1	1
Guinea Bissau	1	0	0	1
Ivory Coast	5	0	0	5
Liberia	1	0	0	1
Mauritania	1	0	0	1
Nigeria	12	1	2	9
Repub. of S. Africa	10	1	1	8
Somali	2	0	0	2
Tanzania	2	0	0	2
Togo	1	0	0	1
Zaire	3	0	0	3
Middle East				
Kuwait	11	4	0	7
Qatar	3	0	0	3
Abu Dhabi	16	1	2	13
Dubai	1	1	0	0
Oman	29	12	2	15
Yemen	1	1	0	0
Syria	30	0	0	30
Turkey	19	1	0	18
Europe				
Austria	23	6	4	13
France	40	6	2	32
Greece	6	0	0	6
Ireland	7	0	0	7
Italy	77	6	29	42
Netherlands	14	1	8	5
North Sea				
UK	43	13	16	14
Norway	18	9	1	8
Holland	13	3	4	6
Denmark	4	2	0	2
Germany	1	0	0	1
Spain	15	2	1	12
Sweden	20	1	0	19
U.K.	21	10	1	10
West Germany	47	7	10	30
Yugoslavia	47	17	13	17
Far East				
Brunei	14	2	2	10
Burma	45	0	2	43
India	37	2	4	31
Indonesia	216	20	7	189
Japan	18	0	0	18
Malaysia	16	3	0	13
Pakistan	17	3	4	10
Philippines	3	0	1	2
Taiwan	4	1	1	2
Thailand	38	0	0	38
Oceania				
Australia	263	5	10	248
New Zealand	8	1	0	7
Papua New Guinea	5	0	0	5

Gas production (billions cu ft)

	1985
WESTERN HEMISPHERE	
Argentina	667.3
Bolivia	88.8
Brazil	193.3
Canada	3,350.6
Chile	208.6
Colombia	186.6
Ecuador	16.8
Guatemala	1.2
Mexico	1,312.2
Peru	44.4
Trinidad	114.4
United States	17,304.0
Venezuela	609.6
Total	**24,097.8**
EUROPE	
Austria	40.7
Denmark	39.7
France	190.7
West Germany	608.1
Greece	1.3
Italy	448.9
Netherlands	2,858.8
Norway	902.2
Spain	10.0
Turkey	49.7
United Kingdom	1,497.1
Total	**6,647.2**
MIDDLE EAST	
Bahrain	226.1
Iran	480.0
Iraq	20.4
Israel	2.4
Kuwait	144.0
Oman	48.0
Qatar	210.0
Saudi Arabia	252.0
Syria	4.8
United Arab Emirates	336.0
Total	**1,723.7**
ASIA-PACIFIC	
Afghanistan	102.0
Australia	473.7
Brunei	300.0
Burma	22.8
India	114.0
Indonesia	1,056.0
Japan	79.1
Malaysia	190.2
New Zealand	170.8
Pakistan	355.3
Taiwan	45.2
Thailand	121.7
Total	**3,030.8**
AFRICA	
Algeria	1,320.0
Angola	12.0
Congo	1.2
Egypt	144.0
Gabon	10.8
Ivory Coast	—
Libya	162.0
Morocco	2.4
Nigeria	96.0
Tunisia	15.6
Total	**1,764.0**
COMMUNIST	
China	600.0
Romania	1,200.0
USSR	22,697.9
Other	960.0
Total	**25,457.9**
WORLD TOTAL	**62,721.4**

Contract carriage transportation, spot market volumes increase

	Contract carriage	Pipeline buy/resale sales	Total transported	Carriage percent of total
	(Trillion cu ft)			
1984				
1st	1.84	3.75	5.59	33
2nd	1.65	2.62	4.27	39
3rd	1.76	2.40	4.16	42
4th	1.52	3.01	4.53	34
1985				
1st	1.67	3.60	5.27	32
2nd	1.48	2.14	3.62	41

	– Spot market sales – To distributors	To industrial/ electric utility	Pipeline buy/resale sales	Total	Spot market percent of total sales
	(Billion cu ft)				
1982	262	98	13,000	13,360	3
1983	466	200	11,900	12,566	5
1984					
1st	148	111	3,748	4,007	6
2nd	141	123	2,620	2,884	9
3rd	129	145	2,402	2,676	10
4th	183	120	3,005	3,308	9
Total	601	498	11,775	12,874	9
1985					
1st	243	137	3,603	3,983	10
2nd	214	195	2,141	2,550	16

Source: Interstate Natural Gas Association of America from member survey.

Take or pay obligations

Although take or pay obligations in some wellhead purchase contracts are an acknowledged problem, producers believe take or pay issues shouldn't become part of transportation regulations.

At Exxon Co. U.S.A., for instance, pipelines incurred $1.3 billion of take of pay obligations with the company during 1982-85.

Through negotiations, Exxon was able to settle $700 million of that obligation by yearend 1985, and was working on the remainder.

Access to transportation wasn't the key to that settlement, said Judd Miller Jr., manager of Exxon's natural gas department. "We definately wouldn't trade take or pay for access to transportation." he said. "The only solution is through negotiation."

Miller, in explaining that pipelines want to renegotiate problem contracts, said, "I remind them that I have some problem contracts, too. It turns out they're not the same contracts. My problem contracts are the old, low priced contracts. Their problem contracts are the high priced contracts."

For producers, the non-market responsive theory cuts two ways, on the low side as well as the high side.

Pipelines, however, believe Order 436 took away most of the latitude in the tools they could use in contract renegotiations with producers. Before the order, pipelines could offer to transport gas for a producer in return for a trade on take or pay relief. Order 436 took away the transportation benefit because any pipeline that accepts the rule must offer nondiscriminatory transportation regardless of take or pay obligations.

Pipeline and producer executives agree there are three basic ways to work through the problems with Order 436:

- Pipelines can volunteer to provide nondiscriminatory contract carriage under Order 436 and resolve problems through individual filings with FERC.
- FERC can start another rulemaking procedure to consider such topics as take or pay, block billing (in which cheap, old gas is reserved for pipelines' firm customers), and a Department of Energy proposal to eliminate vintaging of old gas.
- Congress can legislate a solution.

Columbia Gas System Inc.'s two pipeline subsidiaries used the filing route to deal with their Order 436 problems. The pipelines were among the first to open their systems under conditions contained in Order 436, but they did so on condition that FERC modify certain terms.

Most pipelines, however, elected at the start of 1986 to reject Order 436. It is expected many of these pipelines will eventually accept the order, following Columbia's example to work through problems with a rate filing.

Deliverability reduction.

Producers, meanwhile, are taking steps to reduce their deliverability surplus.

For instance, Exxon at yearend 1985 cut this year's exploration and development drilling program by more than 20% compared with what the company had previously planned.

Exxon is the largest gas producer in the U.S. in terms of volumes. In 1984, the company produced 977 billion cu ft, compared with 944 billion cu ft by runnerup Texaco U.S.A. Exxon also is the largest explorer and developer in the U.S. in terms of net wells drilled. The company drilled 1,279 net wells in the U.S. during 1984, compared with 1,160 net wells drilled by runnerup Shell Oil Co.

Such a reduction in exploration/development activity is a normal phenomenon in a commodity market. With oversupply, even if it's temporary, the producer reduces the manufacture of the commodity. Gas is reaching the status that oil achieved when oil prices were decontrolled in 1981. The market is determining the price of the commodity, not a regulated ceiling price.

These are factors that any explorationist needs to consider when he's looking at particular opportunities. In the current market, that means passing up several drilling opportunities. In fact, new gas wellhead prices at the start of 1986 were below the price needed to replace production.

Despite producer efforts to reduce the U.S. deliverability surplus, a surplus lingers.

In a 1985 survey of the top 100 producers in Texas, Energy Planning found that the 20 largest accounted for about 80% of the gas. These top 20 producers were operating at 75-80% of what they thought were their sustainable productive capacity, while smaller producers were down to an average of about 50-60%.

Meanwhile, the gas bubble in the Gulf of Mexico appeared to be growing at yearend 1985, according to a study by Spears & Associates, Tulsa. The company surveyed 11 major gas producers in the gulf, with production representing 50% of the gulf's total production.

By extrapolating the results to the entire gulf, the survey showed gulf operators producing an average of about 4.4 trillion cu ft/year during 1985, or about 71% of their maximum sustained deliverability. Peak production during the period represented 84% of deliverability. The low production point represented 53% of deliverability.

An American Gas Association (AGA) study found the total U.S. gas bubble is gradually growing smaller. AGA's fore-

WORLDWIDE GAS PROCESSING

Capacities as of January 1, 1985, and average production

Country	No. plants	MMcfd: Gas capacity	MMcfd: Gas throughput	Production-1,000 gal/day (Average based on the past 12 months): Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other	Total products
United States												
Alabama	5	182.0	128.4	....	175.9	20.7	130.8	....	13.9	61.9	....	403.2
Alaska	2	62.0	45.0	....	4.0	....	....	....	46.3	....	....	50.3
Arkansas	5	1,005.0	846.1	....	25.1	6.8	15.9	....	14.6	37.6	4.6	104.6
California	34	1,167.6	685.8	....	461.3	11.3	267.6	24.4	330.8	158.3	13.6	1,267.3
Colorado	43	876.2	507.3	....	129.8	0.8	52.8	14.6	819.5	50.9	16.8	1,085.2
Florida	3	934.0	720.0	66.5	124.1	27.2	55.8	....	....	80.3	....	353.9
Illinois	2	551.5	456.6	497.6	352.8	46.9	79.0	....	2.9	6.0	....	985.2
Kansas	27	5,124.0	3,099.0	247.8	711.6	71.1	283.9	11.8	985.2	167.7	1.1	2,480.2
Kentucky	2	916.0	671.8	....	....	....	....	....	....	....	440.9	440.9
Louisiana	97	22,983.5	12,810.8	1,144.0	1,096.9	330.3	404.6	23.6	7,037.3	627.9	588.9	11,253.5
Michigan	9	675.4	405.1	....	99.3	....	....	....	937.5	20.6	37.6	1,095.0
Mississippi	6	995.0	487.3	....	7.9	....	8.0	....	30.3	8.9	....	55.1
Montana	9	70.0	35.3	....	42.9	8.2	6.4	13.4	39.2	1.5	1.5	113.1
Nebraska	2	13.5	3.1	....	2.8	....	2.1	....	5.0	1.7	....	11.6
New Mexico	39	3,255.2	2,078.4	84.5	131.3	11.8	73.4	57.5	3,278.0	94.0	224.2	3,954.7
North Dakota	11	314.2	205.3	133.3	190.8	....	128.8	29.2	64.3	99.2	17.4	663.0
Oklahoma	110	4,884.9	3,031.7	186.1	430.6	109.2	194.9	464.3	4,364.2	209.8	284.8	6,243.9
Texas	399	21,071.0	12,527.3	2,910.6	3,294.6	384.4	1,543.0	814.7	13,140.6	1,829.1	2,721.5	26,638.5
Utah	11	521.5	268.3	....	128.6	....	30.7	....	173.3	45.0	....	377.6
West Virginia	6	416.0	291.9	213.3	126.1	21.1	40.8	59.5	253.6	1.5	....	715.9
Wyoming	39	1,815.2	1,169.7	....	322.6	6.6	213.9	113.8	688.5	271.8	184.4	1,801.6
Total U.S.	**861**	**67,833.7**	**40,474.2**	**5,483.7**	**7,859.0**	**1,056.4**	**3,532.4**	**1,626.8**	**32,225.0**	**3,773.7**	**4,537.3**	**60,094.3**
Country												
Abu Dhabi	5	2,498.0	1,551.8	....	357.2	288.8	20.2	....	....	203.9	309.2	1,179.3
Algeria	4	5,335.2	4,268.2	....	....	....	....	632.8	....	....	5,449.2	6,082.0
Argentina	11	1,715.9	1,429.0	545.0	496.3	....	339.0	....	....	275.9	....	1,656.2
Australia	4	1,707.0	943.0	414.0	492.0	....	267.0	....	....	....	747.0	1,920.0
Austria	2	5.7	4.7	....	....	....	....	....	0.3	....	....	0.3
Bahrain	1	145.0	110.0	....	115.5	....	96.6	....	....	142.8	....	354.9
Bangladesh	8	460.0	80.0	....	....	....	....	....	....	1.3	14.9	16.2
Bolivia	2	474.0	380.0	....	....	....	....	....	32.6	....	....	32.6
Brazil	5	312.0	245.0	....	....	....	....	277.4	249.5	71.4	....	598.3
Brunei	2	998.0	843.0	....	12.5	....	....	....	81.3	220.6	....	314.4
Canada												
Alberta	360	19,856.9	10,989.0	3,814.7	2,002.3	141.9	1,077.1	727.9	4,080.9	2,775.6	178.0	14,798.4
British Columbia	10	1,791.4	834.6	0.6	42.6	14.3	42.1	....	....	92.2	....	191.8
Northwest Territories	2	196.0	11.9	....	....	....	....	....	....	....	....	....
Saskatchewan	13	157.5	85.5	39.2	....	....	....	....	81.6	....	22.4	143.2
Chile	2	470.0	430.0	....	209.0	....	132.0	....	28.0	83.0	....	452.0
China, Taiwan	4	271.0	127.5	42.3	40.7	1.3	24.1	....	3.1	21.0	....	132.5
Colombia	2	125.0	125.0	145.0	29.0	....	7.0	....	....	6.0	....	187.0
Denmark	1	405.0	150.0	....	....	....	....	....	....	....	....	....
Dominican Republic	1	....	....	....	....	....	....	....	....	....	277.2	277.2
Dubai	1	330.0	300.0	....	....	....	....	....	....	....	1,176.0	1,176.0
Ecuador	2	....	....	....	....	....	....	2.4	9.1	....	....	11.5
Egypt	7	826.0	764.0	....	0.2	0.2	0.2	232.9	....	0.1	694.7	928.3
France	1	900.0	867.0	....	160.0	....	165.0	....	....	415.0	....	740.0
Germany	5	542.9	451.0	....	....	....	....	....	....	....	....	....
Greece	2	39.0	37.0	....	....	....	....	....	83.0	....	....	83.0
Hungary	12	788.5	444.8	....	140.0	3.0	136.5	31.5	110.5	162.1	327.6	911.2
Indonesia	10	933.2	654.9	....	695.0	355.0	....	51.6	465.2	....	73.1	1,639.9
Italy	16	7,101.0	4,909.0	....	....	....	....	29.6	175.0	15.4	....	220.0
Kuwait	1	1,680.0	360.0	....	834.0	....	548.0	....	....	305.0	85.0	1,772.0
Libya	7	1,851.0	1,227.0	....	....	....	....	37.8	5,577.0	....	551.0	6,165.8
Malaysia	1	250.0	157.0	....	337.1	356.6	....	....	....	....	417.3	1,111.0
Mexico	9	3,807.0	3,467.0	3,154.4	7,525.4	....	....	....	....	....	....	10,679.8
Netherlands	1	440.0	350.0	....	....	....	....	....	6.0	....	....	6.0
New Zealand	1	96.0	59.0	....	23.6	....	3.2	....	....	7.9	....	34.7
Norway	1	350.0	79.6	....	....	....	....	....	160.0	....	....	160.0
Pakistan	5	950.0	810.9	....	....	....	....	47.0	....	7.6	7.8	62.4
Peru	3	70.0	27.1	....	....	....	0.6	5.7	....	20.0	1.8	28.1
Qatar	2	578.7	276.8	595.4	580.7	....	354.7	....	....	247.1	....	1,777.9
Saudi Arabia	5	4,300.0	....	....	....	....	....	....	1,176.0	....	....	1,176.0
Sharjah	1	500.0	600.0	....	....	....	....	....	2,436.0	....	....	2,436.0
United Kingdom	5	2,235.0	1,030.0	....	332.0	....	291.0	....	....	1,748.5	46.6	2,418.1
Venezuela	14	2,696.0	2,283.0	59.8	195.7	....	....	632.9	1,774.5	125.7	....	2,788.6
Total, outside U.S.	**551**	**68,187.9**	**41,763.3**	**8,810.4**	**14,620.8**	**1,161.1**	**3,504.3**	**2,709.5**	**16,529.6**	**6,948.1**	**10,378.8**	**64,662.6**

alternate pipeline routes for their export crude.

Iran was working early this year on two pipeline routes to move crude to its proposed export terminal at Asaluyeh, about 260 miles southeast of Kharg Island outside the normal range of Iraq's war planes. One route would involve 250 miles of 42-in. line from Gerreh pump station.

Iraq, meanwhile, built a 397-mile, 48-in. line from the southern region of the country to Yanbu, which is on Saudi Arabia's Red Sea coast.

• Interprovincial Pipe Line Ltd., Toronto, is seeking industry partners to lay a crude oil pipeline to the Canadian Beaufort Sea.

The company built a 540-mile line from Norman Wells field in the Northwest Territories to Zama Lake in northern Alberta. A pipeline to the Beaufort Sea could be a northern extension of that system.

Interprovincial also plans a $125-million expansion of its oil pipeline system in western Canada.

Non-Communist pipeline construction in 1986 and beyond*

Area	†4-10 in.	12-20 in.	22-30 in.	Larger than 30 in.	Total
	Miles				
GAS PIPELINES					
U.S.	1,585	1,218	1,266	2,021	6,090
Canada	2,615	267	67	1,463	4,355
Latin America	890	1,711	1,825	237	4,663
Western Europe	4,308	1,858	627	1,165	7,958
Middle East	177	18	449	776	1,420
Africa	200	25	175	541	941
Asia-Pacific	931	1,220	733	410	2,594
Total Gas	**10,006**	**6,317**	**5,085**	**6,613**	**28,021**
CRUDE PIPELINES					
U.S.	202	251	2,071	1,043	3,567
Canada	216	912	1,770	1,418	4,316
Latin America	145	1,046	522	31	1,744
Western Europe	59	113	—	—	172
Middle East	171	102	882	2,859	4,014
Africa	7	—	—	—	7
Asia-Pacific	362	79	188	187	816
Total Crude	**1,162**	**2,503**	**5,433**	**5,538**	**14,636**
PRODUCTS PIPELINES					
U.S.	391	835	426	—	1,652
Canada	256	75	—	—	331
Latin America	1,044	1,008	—	—	2,052
Western Europe	19	71	—	—	90
Middle East	226	86	—	—	312
Africa	187	—	—	—	187
Asia-Pacific	37	4	—	—	41
Total products	**2,160**	**2,079**	**426**	**—**	**4,665**
NON-COMMUNIST WORLD TOTALS					
Gas	10,006	6,317	5,085	6,613	28,021
Crude	1,162	2,503	5,433	5,538	14,636
Products	2,160	2,079	426	—	4,665
Total	**13,328**	**10,899**	**10,944**	**12,151**	**47,322**

*Projects planned or under way in 1986 and scheduled for completion beyond 1986.† Includes some projects of less than 4 in. diameter.

Gas lines

Major non-Communist world gas pipeline projects are scheduled for India, the U.S., Australia, and Argentina.

India has received bids from four contractors to construct a $1.7 billion, 994-mile pipeline to move gas from fields off western India to the northern region of the country.

Completion of the line is set for July 1989.

The line at first will move more than 653 MMcfd of gas from Bombay High and South Bassein fields to six fertilizer plants, plus providing gas to three electrical power plants and two gas processing plants along the route. Five more fertilizer plants are planned after 1990.

In the U.S., the projects generally involve supplying U.S. and Canadian gas to California enhanced oil recovery/cogeneration projects and Canadian gas to U.S. Northeast and Midwest markets.

Three major gas pipelines in California are proposed by different groups that are competing for the lucrative San Joaquin Valley EOR/cogeneration market.

Mojave Pipeline Operating Co., a partnership consisting of HNG/InterNorth Inc., El Paso Natural Gas Co., and Pacific Lighting Corp., proposes to lay and operate a 430-mile, $250-million line from Topock, Ariz., to San Ardo, Calif., with a lateral to north of Bakersfield, Calif.

Kern River Gas Transmission Co., a joint venture of Kern River Corp. and Williams Western Pipeline Co., proposes a 770-mile line from Kemmerer, Wyo., to EOR projects in Kern County, Calif.

And units of TransCanada PipeLines Ltd. and Lear Petroleum Corp. propose the 383-mile, 42-in. El Dorado pipeline from Topock to Bakersfield and points west.

Applications for certification from each proposed project are pending with the FERC.

In the U.S. Northeast and Midwest, TransCanada PipeLines Ltd. and Natural Gas Pipeline Co. of America (NGPL) propose competing projects to move gas from western Canada.

A third project, sponsored by ANR Pipeline Co., HNG/InterNorth Inc., and Northern Border Pipeline Co., was dropped last year after ANR was acquired by Coastal Corp.

TransCanada's proposal is to transport gas from Alberta through two routes: one to northern Ontario and the other using Great Lakes Gas Transmission Co.'s U.S. system.

Through the northern Ontario route, gas would eventually move to Niagra Falls where a new line would be constructed to Leidy, Pa. Great Lakes plans to lay 350 miles of 36-in. loop from Emerson, Man., through Minnesota, Wisconsin, and Michigan to St. Clair, Mich.

NGPL's proposal calls for a 146-mile line from the Northern Border terminus at Ventura, Iowa, to NGPL's system at Harper, Iowa.

Meanwhile, Tennessee Gas Pipeline Co. plans to lay a line from New Brunswick to Maine to bring Venture field gas off Nova Scotia to New England markets.

In Australia, construction has begun on a 900-mile, 12-14 in. line to bring Mereenie and Palm Valley fields gas production to Darwin. Completion of the $200-million project is expected by yearend. And Argentina plans a $200-million expansion of its 1,081-mile, 24-in. gas line from the Bolivian border to Buenos Aires and elsewhere. The project includes looping, replacement of pipeline sections, and incorporation of a telemetry system.

Meanwhile, Argentina and Brazil last year began studying the feasibility of a 932-mile gas line from Argentina to Sau Paulo, Brazil. The study is still under way.

In other gas pipeline construction:

Non-Communist pipeline construction in 1986

Area	†4-10 in.	12-20 in.	22-30 in.	Larger than 30 in.	Total
			Miles		
GAS PIPELINES					
U.S.	923	674	901	665	3,163
Canada	1,340	110	8	21	1,479
Latin America	375	656	428	62	1,521
Western Europe	2,301	1,436	408	588	4,733
Middle East	86	13	92	443	634
Africa	40	25	90	344	509
Asia-Pacific	40	1,043	3	—	1,086
Total Gas	**5,115**	**3,957**	**1,930**	**2,123**	**13,125**
CRUDE PIPELINES					
U.S.	155	159	—	—	314
Canada	116	538	—	—	654
Latin America	46	373	505	31	955
Western Europe	37	24	—	—	61
Middle East	125	91	513	1,152	1,881
Africa	—	—	—	—	—
Asia-Pacific	279	79	188	187	733
Total Crude	**758**	**1,264**	**1,206**	**1,370**	**4,598**
PRODUCTS PIPELINES					
U.S.	216	339	384	—	939
Canada	230	75	—	—	305
Latin America	210	78	—	—	288
Western Europe	19	71	—	—	90
Middle East	6	12	—	—	18
Africa	—	—	—	—	—
Asia-Pacific	33	4	—	—	37
Total products	**714**	**579**	**384**	**—**	**1,677**
NON-COMMUNIST WORLD TOTALS					
Gas	5,115	3,957	1,930	2,123	13,125
Crude	758	1,264	1,206	1,370	4,598
Products	714	579	384	—	1,677
Total	**6,587**	**5,800**	**3,520**	**3,493**	**19,40**

*Projects planned or under way in 1986 and scheduled for completion beyond 1986.† Includes some projects of less than 4 in. diameter.

• Texas Eastern Transmission Corp. plans a $237-million expansion of its Pennsylvania and New Jersey system in order to serve new markets in New York. The project calls for about 200 miles of additional loops of the company's Pittsburg-Newark system.

• Mobile Bay Co., a joint venture of ANR Pipeline Co. and United Gas Pipe Line Co., plans to lay and operate a 23-mile, 30-in. line to bring gas production from Mobil Oil Exploration & Production Southeast Inc.'s Mary Ann field off Alabama to United's trunkline.

• Houston Pipe Line Co. plans to lay 100 miles of 30-in. and 93 miles of 24-in. pipe from a point on the Oasis Pipeline in Caldwell County, Tex., south to a point near Hebronville, Tex. The $100-million extension is designed to increase the company's flexibility to move gas.

• MidCon Corp. and Southwestern Energy Co. plan to build a 113-mile, 16-in. gas line from near Paris, Ark., to White County, Ark. The $28-million Razorback intrastate system is expected to start service early this year.

Other pipelines

Product and CO_2 transport are two other sources of pipeline construction activity. Meanwhile, coal slurry—once expected to be a major factor in pipeline construction activity—appears to be a dead issue in the U.S.

The largest product pipeline construction project in the U.S. continues to be a $400-million conversion of HNG/InterNorth's Transgulf pipeline. The project is to convert a Florida Gas Transmission Co. gas line to products service.

The project, opposed by shipping interests that would lose a share of the Texas-Florida transport market, involves construction of about 300 miles of looping on the line. Construction is expected to be completed this year.

CO_2 pipeline construction activity in the U.S., meanwhile, is still in its infant stages. The CO_2 is used to boost oil recovery in declining oil fields at a reasonable cost.

The first big CO_2 pipeline projects were completed in 1984. These were the Cortez, Sheep Mountain, and Bravo Dome trunklines that bring CO_2 to EOR projects in the Permian basin region of eastern New Mexico and West Texas.

Since construction of the three trunklines, there has been a construction flurry of distribution systems. Other major CO_2 trunklines have been laid in Mississippi and the Rocky Mountain region.

In Mississippi, Shell Oil Co. completed construction of the Choctaw pipeline last year to bring CO_2 from near Jackson, Miss., to EOR projects near McComb, Miss. Shell eventually plans to extend the line 146 miles to EOR projects near Weeks Island, La.

And in the Rocky Mountains, Chevron Corp. has laid a 129-mile, 16-in. line to transport CO_2 from near Rock Springs, Wyo., to Rangely field, Rio Blanco County, Colo., for EOR projects.

Meanwhile, major coal slurry pipeline construction in the U.S. doesn't appear likely in the near term. Of eight projects being planned during 1983, none remained under consideration by first quarter 1986.

By early 1985, only two projects were still under consideration: the Trans-Virginia system to transport coal from West Virginia to the Atlantic Coast and the Aquatrain system from Wyoming to California. Sponsors dropped both projects due to lack of markets and opposition of rail road companies that would lose marketshare.

The future

The persistent depression in the pipeline construction industry is a reflection of the oversupply of crude oil and natural gas. Generally, when more line is built, it is to extend a mature system. Any new systems are built because of changes in energy patterns, either to alleviate bottlenecking problems or to tie into a new supply source or market. But much of the current work being done by the industry involves take up and re-lay, rehabilitation, loops, short lines, and laterals.

International work in the past was mainly export lines. Due to the downturn in marketshare of many exporters, however, there's little demand for new facilities. The war in the Middle East as impetus for new construction is probably at its nadir. The industry's outlook isn't bright. There should be further consolidations. And the industry will become more regionalized and specialized as contractors try to carve out a niche in order to survive. PE

U.S. interstate pipeline mileage, deliveries holding level

PARTIALLY BECAUSE U.S. NATURAL GAS OPERATting companies began preparing for deregulation on Jan., 1, 1985, the U.S. interstate pipeline network began expanding in 1984. That is the most recent year for which detailed pipeline construction data are available from the U.S. Federal Energy Regulatory Commission (FERC).

Annual reports for 1984 filed with the FERC by the interstate crude oil, refined products, and natural gas pipeline companies indicate this expansion in both liquids and natural gas pipeline systems.

But a look at total U.S. interstate pipeline mileage as reported to the FERC (Table 1) would appear to contradict this conclusion. This mileage shows 432,301 miles of pipeline for 1984 compared with 453,023 for 1983, an apparent decrease of 20,722 miles.

This total, however, is affected by new FERC classifications of interstate natural gas pipeline companies. The basis for the new classification will be explained later and 1984's total compared with 1983's.

Total liquids lines, in the meantime, experienced a slight upturn of 3.6%, from 167,819 total miles for 1983 to 173,922 for 1984. Crude oil lines shrank fractionally, while gathering and products systems expanded.

Table 1

U.S. interstate pipeline mileage

Year	Miles		
	Gas	Liquid	Total
1973	284,773	170,691	419,464
1974	246,872	173,341	420,213
1975	255,792	172,680	428,472
1976	254,548	174,072	428,590
1977	256,198	170,948	427,146
1978	258,576	162,452	421,028
1979	264,134	169,794	433,928
1980	274,248	172,673	446,921
1981	274,634	172,815	447,449
1982	286,999	172,549	459,548
1983	285,204	167,819	453,023
1984	*258,379	173,922	*432,301

Source: U.S. FERC From 6 Annual Reports—oil pipelines; Forms 2 & 2A—gas pipelines.
*Reflects mileage reported under the FERC's new gas-pipeline company classification system; only majors (43 for 1984) are required to report mileage. For 1984, an additional 20 nonmajors also reported mileage. Definitions of "major" and "nonmajor" are found at the end of the table, and in the FERC's Accounting and Reporting Requirements for Natural Gas Companies, para. 20-011.

Construction pace

The Oil & Gas Journal's Worldwide Construction Report (OGJ, Oct. 21, 1985) listed 80 individual pipeline projects totaling more than 11,200 miles of U.S. pipeline construction either proposed and before the FERC, approved by the FERC and planned, or under way.

Some, especially pipelines to bring gas from Alaska and from Canada into the lower U.S. as well as other gas and product lines in the western U.S., are projects competing for the same markets or uneconomical for the foreseeable future. These are unlikely to be built.

By comparison, the Journal's Oct. 29, 1984, construction report listed 108 U.S. pipeline projects proposed, planned, or under way, totaling more than 10,240 miles.

Natural gas pipeline projects reported in the October 1985 report add to 70 involving more than 7,600 miles of pipeline. The report a year earlier listed 86 natural gas pipeline projects totaling 6,300 miles.

Crude oil projects in that 1985 report totaled 11 comprising more than 2,900 miles. Here, also, with two major projects, one under construction, to bring California crude oil to Texas refineries, one project seems destined for elimination. OGJ's construction report from Oct. 29, 1984, listed 7 crude-oil pipeline projects totaling 2,100 miles.

Finally, OGJ listed 9 products pipelines projects with more than 650 miles pipeline. A year earlier, 15 products pipeline projects totaling 1,714 miles were reported.

U.S. interstate network

Total 1984 mileage, from annual reports filed with the FERC by the regulated interstate liquids and gas pipeline companies, adds up to 432,301 miles: 173,922 miles of

Liquid pipeline investment

Fig. 1

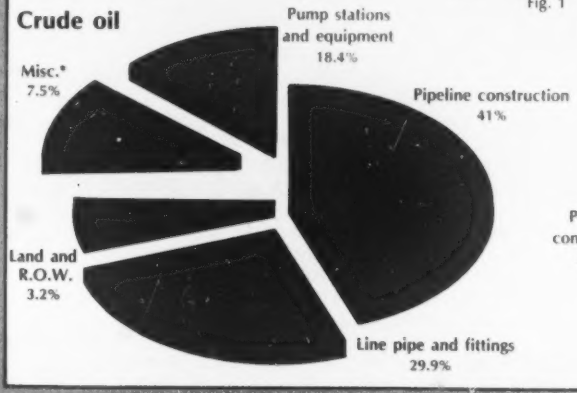
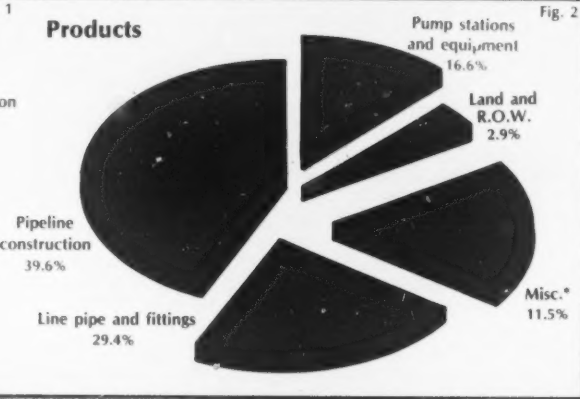


Fig. 2



Investment in liquids pipelines

Table 2

Item	A	B	C	D	E	Total, $	Percent
Crude pipelines investment by five companies							
Land	1,468,224	750,450	294,320	995,493	1,179,649	4,688,136	0.31
Right of way	12,080,048	999,669	316,178	16,028,239	14,916,567	44,340,701	2.89
Line pipe	130,340,901	25,628,038	11,262,596	88,057,211	151,786,877	407,075,623	26.57
Line pipe fittings	7,055,240	895,867	1,754,951	16,482,169	24,402,647	50,590,874	3.30
Pipeline construction	178,596,543	26,622,036	15,626,854	202,378,537	206,257,496	629,481,466	41.08
Buildings	11,380,434	4,804,709	2,505,754	13,072,310	8,786,468	40,549,675	2.65
Boilers	—	—	—	—	—	—	
Pumping equipment	17,391,584	5,506,186	2,414,882	16,150,999	47,696,096	89,159,747	5.82
Machine tools and machinery	—	—	—	33,140	1,170	34,310	—
Other station equipment	64,799,310	17,813,840	4,487,331	41,804,789	22,644,046	151,549,316	9.89
Oil tanks	14,128,188	6,030,507	5,678,530	16,128,679	26,308,918	68,274,822	4.46
Delivery facilities	—	—	5,237,731	2,385,266	6,840,273	14,463,270	0.94
Communications systems	421,842	2,781,997	4,709	9,883,817	2,764,037	15,856,402	1.03
Office furniture & equipment	464,194	190,620	146,006	775,120	2,175,932	2,751,872	0.18
Vehicles and other work equip.	5,861,026	1,706,069	436,349	5,273,635	228,311	13,505,390	0.88
Other property	—	—	—	—	49,795	49,795	
Total	443,987,534	93,729,988	50,166,191	429,449,404	515,038,282	1,532,371,399	
Product pipelines investment by five companies							
Land	4,272,888	1,743,257	531,121	852,997	3,114,965	10,515,228	0.3
Right of way	27,713,049	10,819,971	17,835,395	8,367,898	7,461,603	72,197,916	2.6
Line pipe	338,178,215	67,541,298	105,731,596	85,414,529	109,412,714	706,278,352	25.2
Line pipe fittings	71,507,597	12,504,831	14,085,393	1,577,520	17,054,974	116,730,315	4.2
Pipeline construction	554,725,571	108,360,484	192,334,845	93,622,099	158,121,584	1,107,164,583	39.6
Buildings	22,985,337	3,793,816	4,400,997	9,984,589	16,363,724	57,528,463	2.1
Boilers	—	—	—	—	—	—	
Pumping equipment	45,769,804	5,776,637	29,756,285	27,537,862	22,826,958	131,667,546	4.7
Machine tools & machinery	—	—	—	—	293,539	293,539	—
Other station equipment	115,430,887	20,207,893	34,252,981	22,694,228	81,558,146	274,144,135	9.8
Oil tanks	47,851,926	16,993,316	8,711,979	17,444,107	40,169,627	131,170,955	4.7
Delivery facilities	—	—	9,458,609	10,546,656	38,620,446	58,625,711	2.1
Communication systems	1,000,119	258,698	1,975,297	7,723,139	—	10,957,253	0.4
Office furniture & equipment	9,078,016	1,282,230	1,315,486	479,842	452,383	12,607,957	0.4
Vehicles & other work equip.	4,804,472	1,476,132	5,773,167	1,834,884	1,355,744	15,244,399	0.6
Other property	72,798,033	—	18,542,778	—	—	91,340,811	3.3
Total	1,316,115,914	250,758,563	444,705,929	288,080,350	496,806,407	2,796,467,163	

Source: U.S. FERC form 6 pipeline annual reports-1984.

liquids pipelines; 258,379 miles of natural gas pipelines (Table 1).

Annual reports filed for 1983 showed a total of 453,023 miles: 167,819 miles of liquids pipelines and 285,204 miles of natural gas pipelines.

The mileage for 1984 represents 138 liquids pipeline companies and 142 natural gas companies, while the mileage for 1983 represents 141 liquids pipeline companies and 112 natural gas companies. For the 1984 liquids companies, an additional six filed with the FERC but did not, for various reasons, include any mileage.

New basis

For any year, mileages are not directly comparable, as the number of companies required to file reports with FERC varies slightly each year.

Comparisons using 1984 FERC annual report data, furthermore, would appear even more difficult, since far fewer natural gas companies reported mileage and gas sales data for 1984. Of those 142 companies filing annual reports with the FERC for 1984, only 62 (43.7%) included mileage and gas sales data.

The explanation lies in a major revision made by the FERC for the 1984 reporting year to its classification system for regulated natural gas pipeline companies which must file an annual report.

Natural gas companies were formerly distinguished based on operating incomes and classified as Class A or B companies. Class A companies were those having annual operating revenues of $2.5 million or more; Class B, those with revenues between $1 and $2.5 million.

The new basis uses total natural gas transmissions for each of the 3 previous reporting years. (See FERC Accounting and Reporting Requirements for Natural Gas Companies, paragraph 20-011.)

Classified as "major" companies for reporting 1984 data were companies whose combined gas sold for resale and gas transported or stored for a fee in each of the 3 previous years exceeded 50 bcf at 14.73 psi (60° F.).

An interstate natural gas pipeline company is "nonmajor" if it is not classified as major and had total gas sales for each of the 3 previous years of volume transactions exceeding 200,000 Mcf at 14.73 psi (60° F.).

Under the 1984 classification system, the FERC listed 43 major natural gas pipeline companies which comprised 30.3% of the 142 companies filing 1984 annual reports with the FERC. Each of these was to have filed an FERC Form 2, as in previous years.

But the newly designated nonmajors (99; 69.7%) were required to file a shortened Form 2A. Among other data, this new form does not request pipeline mileage.

Some comparisons

Some qualifying, therefore, is in order for comparisons between 1984's total natural gas pipeline mileage and sales figures and previous years' totals.

And a common basis for comparisons exists with the FERC's major natural gas pipeline companies.

For 1983, those companies reported total mileage of 248,799, or 87.2% of the 285,204 total miles reported.

show, the major investment is in pipeline construction: 41% for the crude oil pipelines and 39.6% for the products pipelines.

Line pipe and fittings account for just less than 30% for both crude oil and products pipeline investment, while pump stations and equipment account for 18.4% of the investment in crude oil pipelines and 16.6% for products pipelines.

Construction costs

As Figs. 1 and 2 show, the cost of line pipe and fittings and the cost of laying pipelines add up to roughly 70% of the cost of a pipeline system. These elements of pipeline construction costs continue to rise each year.

The 1984 OGJ-Morgan Pipeline Indexes for oil and for gas show that the composite oil-pipeline cost index increased from 150 at the end of 1978 to 218 at the end of 1984, an increase of 45.3% in 6 years, while the composite gas-pipeline cost index rose from 122 in 1978 to 196 at the end of 1984, an increase of 60.66%.

These data suggest that in 4 to 5 years, the cost of constructing pipelines could double.

For the past 2 years, however, cost increases have been nearly flat: For oil pipelines, the index was 212 for 1983 and 218 for 1984; for natural gas pipelines, 192 for 1983, 196 for 1984.

Table 3 lists a 10-year onshore construction cost trend for natural gas pipelines with diameters ranging from 8 to 36-in. As the table reflects, the average cost per mile for any given diameter may increase or decrease from one year to the next, due to such variables as terrain, population density, and others affecting construction cost.

The cost/mile trends from 1983 to 1984 are down, with five of seven diameter classifications showing declines. Construction figures for a 12-in. pipeline, for example, fell from $476,050/mile for 1983 to $253,813/mile for 1984, a decrease of 46.7%.

This 10-year trend, which has shown a consistent rise in average construction cost per mile, may be starting to indicate moderation in pipeline construction costs.

FERC applications

Table 4 lists 55 natural gas pipeline construction projects onshore and 7 offshore. The onshore projects represent 2,283.93 miles of pipeline at an estimated price tag of more than $1.6 billion, and the offshore pipeline projects represent 75.97 miles of offshore pipeline with an estimated price tag

10-year onshore construction-cost trend

Size	Year*	Average cost, $/mile					Range, $/mile	
		R.O.W.	Material	Labor	Misc.	Total	Low	High
8 in.	1985	3,141	28,144	47,317	16,283	94,884	64,203	228,866
	1984	22,339	49,974	175,733	74,086	322,132	223,767	540,655
	1983	6,244	48,392	89,600	23,088	167,324	159,940	178,020
	1982	8,996	46,002	67,950	31,769	154,717	73,596	572,926
	1981	8,119	34,860	23,528	20,884	87,391	55,981	109,078
	1980	8,247	39,040	102,839	13,036	163,162	149,926	200,554
	1979	1,189	40,692	63,518	14,951	123,350	50,374	581,916
	1978	1,590	32,123	30,554	8,660	72,927	61,614	109,956
	1977	1,403	34,423	27,002	8,963	71,791	28,844	126,063
	1976	....	....	....	....	....	....	....
12 in.	1985	26,582	74,620	106,447	46,164	253,813	131,765	767,548
	1984	23,035	147,750	211,783	93,481	476,050	338,872	608,685
	1983	5,135	91,492	73,042	20,754	190,423	177,050	218,265
	1982	10,536	84,972	102,390	32,173	230,071	130,252	669,227
	1981	3,855	71,444	65,613	11,861	152,773	55,981	369,018
	1980	2,610	54,235	41,089	14,111	112,045	78,428	901,282
	1979	1,590	46,062	47,283	7,121	102,056	96,822	158,185
	1978	6,697	55,362	61,919	13,830	137,808	(†)	(†)
	1977	4,332	34,429	22,658	4,573	65,992	53,839	177,694
	1976	....	....	....	....	....	....	....
16 in.	1985	8,511	80,529	47,708	20,091	156,839	154,746	167,876
	1984	15,106	131,139	111,234	82,747	340,226	231,790	363,718
	1983	31,542	337,088	929,969	278,159	1,576,758	447,890	2,370,748
	1982	6,278	104,319	113,380	21,936	245,913	175,715	430,841
	1981	9,203	110,684	133,968	40,424	294,279	140,674	590,112
	1980	7,404	74,571	57,681	18,050	157,706	118,085	471,972
	1979	....	....	....	....	....	....	....
	1978	7,506	54,936	54,117	12,552	129,111	86,898	203,721
	1977	3,635	50,574	32,260	9,347	95,817	68,897	145,916
	1976	3,248	80,373	26,575	9,419	119,615	(†)	(†)
20 in.	1985	108,870	187,379	190,886	144,974	632,109	353,088	1,277,454
	1984	16,735	175,406	190,088	63,302	445,531	226,415	616,250
	1983	12,682	147,354	154,811	46,073	360,934	237,600	476,104
	1982	12,284	124,148	128,148	30,649	295,229	210,378	482,464
	1981	8,556	122,659	114,147	30,370	275,732	227,679	1,741,597
	1980	11,470	130,438	73,751	48,213	263,872	157,947	533,265

of more than $55 million.

The pipeline projects represent the major construction permit (CP) applications for natural gas pipelines filed with FERC from June 1, 1984, to June 1, 1985.

Figs. 3 and 4, derived from Table 4 for both onshore and offshore pipelines, show the major components of pipeline construction cost.

For onshore pipelines, material—including line pipe, fittings, valves, coating, etc.—represents an average of 43.3% of the construction cost; labor, 34.9%.

By contrast, for offshore pipelines, material represents 28.5% of the construction cost; labor, 40%. Thus, labor and material comprise 78.2% of the estimated cost of constructing onshore pipelines and 68.5% of the cost for offshore pipelines.

Compressor station costs make up another major cost element of natural gas pipelines. Table 5 lists 21 onshore compressor station projects all of whose CP applications were filed with FERC between June 1, 1984 and June 1, 1985. Fig. 5 shows the cost split for onshore compressor stations based on data in Table 5. The cost of equipment and materials represents about 47.6% of the cost of a compressor station, while installation labor amounts to about 23.5%.

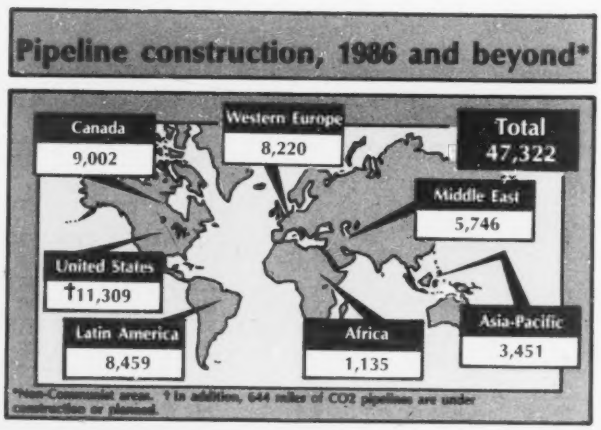


Table 3

Size	Year*	Average cost, $/mile R.O.W.	Material	Labor	Misc.	Total	Range, $/mile Low	High
	1979	....	....	....	....	....	....	....
	1978	3,235	101,052	83,810	12,346	200,443	153,959	242,685
	1977	5,415	95,045	85,842	16,044	202,346	110,349	312,337
	1976	....	....	....	....	....	....	....
24 in.	1985	26,648	296,486	305,437	151,657	780,228	469,318	4,893,740
	1984	29,133	289,487	298,521	128,390	745,531	395,676	1,772,049
	1983	31,416	310,583	501,401	148,993	995,393	608,781	1,649,454
	1982	28,537	508,226	807,847	120,895	1,465,505	(†)	(†)
	1981	30,078	269,414	395,204	127,790	822,486	350,898	826,088
	1980	14,220	162,019	152,406	52,114	380,759	230,122	820,295
	1979	5,268	152,878	193,227	19,206	370,579	(†)	(†)
	1978	2,372	112,790	125,435	17,045	257,642	239,480	371,932
	1977	....	....	....	....	....	....	....
	1976	4,784	95,656	94,319	29,755	224,514	(†)	(†)
30 in.	1985	60,408	320,219	314,878	152,035	847,541	668,640	5,778,947
	1984	20,885	336,043	376,631	183,034	916,592	637,546	1,413,826
	1983	23,872	253,071	348,478	116,084	741,506	660,086	1,683,143
	1982	20,756	296,737	362,787	93,103	773,383	548,396	1,179,760
	1981	14,135	309,364	201,037	73,281	597,817	561,358	4,684,745
	1980	13,206	227,229	134,491	46,018	420,944	319,482	921,772
	1979	25,884	239,454	290,474	35,752	591,560	529,178	604,298
	1978	12,231	187,718	216,264	20,895	437,108	(†)	(†)
	1977	6,485	147,814	91,862	22,469	268,630	266,513	270,684
	1976	22,456	112,497	96,141	19,750	250,844	168,029	471,679
36 in.	1985	21,967	389,751	296,742	157,536	865,997	629,179	6,443,590
	1984	36,063	358,876	362,667	152,787	910,393	665,480	2,143,680
	1983	51,436	498,047	490,568	306,666	1,346,717	703,112	2,724,493
	1982	13,429	375,281	176,287	58,733	623,730	615,160	833,546
	1981	5,948	344,374	358,072	74,415	782,809	693,945	1,573,759
	1980	20,677	344,664	268,753	87,850	721,944	528,710	1,105,515
	1979	20,654	272,397	203,639	57,814	554,504	443,024	682,280
	1978	26,441	199,878	150,667	65,439	442,425	(†)	(†)
	1977	20,101	209,878	115,498	18,366	363,843	(†)	(†)
	1976	....	....	....	....	....	....	....

*1976-1978 based on completed costs reported to the U.S. FERC by fiscal year; 1979-1982 by calendar year. 1983-85 based on FERC construction permit applications, by fiscal year. †One report only.

Current pipeline costs

Table 4

Size, in.	Location	Miles	Material($)	Labor($)	Misc. ($)*	R.O.W. & damages($)	Total($)	$/mile
ONSHORE PIPELINES								
2	S. Dakota	5	84,214	141,122	79,551	23,124	328,011	65,602
4	Montana†	1.2	18,000	9,500	11,780	—	39,280	32,733
4	Kansas	15.4	255,000	180,000	75,000	90,000	600,000	38,961
6	Alabama	37.5	861,369	736,700	146,568	380,400	2,125,037	56,668
6	S. Dakota	48.5	816,465	1,368,195	696,430	224,190	3,105,280	64,026
8	Illinois	2	90,000	284,000	80,732	3,000	457,732	228,866
8	Texas	2.5	121,412	72,118	5,828	—	199,358	79,743
8	S. Dakota	7.5	126,321	211,683	108,832	34,686	481,522	64,203
10	Connecticut§	4.4	294,000	1,766,000	435,716	582,000	3,077,716	699,481
10	Rhode Island§	3.9	264,000	1,548,000	249,702	526,000	2,587,702	663,513
10	Arkansas	0.57	46,200	74,800	26,542	—	105,962	185,898
10	Delaware§	13.3	709,592	879,127	223,484	1,663	1,813,866	136,381
12	Louisiana	0.5	120,400	49,700	68,330	11,000	249,430	498,860
12	New York	1.9	300,000	75,000	14,889	1,500	391,389	205,994
12	Massachu-setts§	2.5	232,000	969,000	254,871	463,000	1,918,871	767,548
12	Kansas	5.1	297,000	248,000	92,000	35,000	672,000	131,765
12	Ark.-Tex.	9.0	719,790	1,058,040	467,170	288,000	2,533,000	281,444
12	Pennsylvania§	10.7	709,122	839,262	221,924	16,264	1,786,572	166,969
12	Michigan§	15.1	1,196,800	1,638,700	890,600	181,200	3,907,300	258,762
12	Arkansas	19.5	1,515,460	2,598,460	980,431	249,600	5,343,951	274,049
12	Arizona	19.8	1,185,000	1,476,000	892,137	990,000	4,543,137	229,451
16	Wyoming	19.3	1,667,000	996,000	411,000	166,000	3,240,000	167,876
16	Wyoming	27.2	2,230,000	1,289,000	550,000	231,000	4,300,000	158,088
16	Neb.-Kansas	118.0	9,350,000	5,563,000	2,344,000	1,003,000	18,260,000	154,746
20	New York†	0.4	75,000	16,900	49,335	—	141,235	353,088
20	California	16.0	5,648,762	7,500,478	4,694,913	2,595,111	20,439,264	1,277,454
20	Wyoming	17.71	3,045,000	2,378,000	2,526,000	42,000	7,991,000	451,214
20	California	44.0	5,867,400	5,014,700	4,053,697	5,866,700	20,802,497	472,784
22	Tennessee§¶	0.7	462,200	1,381,800	186,000	10,000	2,040,000	2,914,286
24	Texas	0.6	245,900	2,025,400	642,944	22,000	2,936,244	4,893,740
24	Ohio§	1.2	264,700	251,000	62,370	15,000	593,070	494,225
24	W. Virginia†	1.9	398,000	810,000	186,951	15,000	1,409,951	742,079
24	W. Virginia†	2.5	517,000	860,000	192,030	19,000	1,588,030	635,212
24	New Jersey	3.44	1,909,883	3,004,556	1,257,026	181,632	6,353,097	1,846,830
24	W. Virginia†	4.2	851,600	1,500,500	409,830	35,000	2,796,930	665,936
24	W. Virginia†	7.5	1,621,000	3,105,000	811,996	50,000	5,587,996	745,066
24	Texas	10.8	4,964,500	4,764,100	2,886,764	288,000	12,903,364	1,194,756
24	Kentucky†	10.8	2,131,200	5,289,800	1,236,023	135,000	8,792,023	814,076
24	California	17.0	3,413,700	2,452,370	1,698,171	1,121,400	8,685,641	510,920
24	Texas	24.9	12,376,800	8,067,200	5,909,980	52,000	26,405,980	1,060,481
24	New York	27.7	4,481,000	5,888,670	1,721,446	909,000	13,000,116	469,318
24	Texas	29.2	8,848,700	5,274,100	4,480,336	934,000	19,537,136	669,080
30	Louisiana†¶	0.76	794,820	2,955,000	612,180	30,000	4,392,000	5,778,947
30	New Jersey§	15.6	6,116,000	11,189,000	2,927,441	2,173,000	22,405,441	1,436,246
30	New York†	19.8	6,720,930	6,598,070	905,811	714,000	14,938,811	754,485
30	Alabama	24.5	6,952,000	5,890,000	2,942,675	597,000	16,381,675	668,640
30	California	75.0	22,857,200	16,084,300	13,237,021	4,681,000	56,859,521	758,127
36	Louisiana¶	0.78	882,500	3,438,500	700,000	5,000	5,026,000	6,443,590
36	New Jersey§	4.13	2,736,150	5,149,052	1,959,329	264,320	10,108,851	2,447,664
36	Illinois	11.1	3,922,000	2,817,000	1,411,820	302,000	8,452,820	761,515
36	Iowa-Ill.†	81.0	31,000,000	16,035,000	1,407,510	2,521,000	50,963,510	629,179
36	Arizona-Calif.	322.5	108,532,300	75,661,190	49,027,824	18,497,500	251,718,814	780,523
36	Minn., Wis., Mich.§	350.4	134,756,100	122,660,500	27,938,000	3,854,400	289,209,000	825,368
36	California	762.0	315,234,500	228,821,200	158,886,129	8,208,000	711,149,829	933,267
42	Georgia§	5.44	3,196,564	1,974,896	1,300,392	87,200	6,559,052	1,205,708
OFFSHORE PIPELINES								
6	Texas	5.67	363,100	880,000	237,100	19,800	1,500,000	264,550
10	Texas	15.0	2,587,600	2,960,600	1,662,824	2,000	7,213,024	480,868
12	Louisiana	7.6	1,394,000	2,120,000	1,011,290	—	4,525,290	595,433
12	Texas	8.0	1,200,000	1,934,000	1,194,500	—	4,328,500	541,062
12	Texas	14.1	2,576,800	3,439,100	1,838,376	19,000	7,873,276	558,388
12	Texas	15.6	2,848,200	3,653,400	1,979,928	2,000	8,483,528	543,816
20	California	10	4,850,948	7,240,598	8,375,062	1,208,427	21,675,035	2,167,504

Source: U.S. FERC construction permit applications, 6/1/84-6/1/85. *Includes engr., supv., surveying, interest, adm. & overheads, contingencies, and FERC fees. †Replacement. §Loop. ¶River crossing.

Current compressor station costs

Table 5

Location*	Horsepower	$ Equipment & material	$ Labor	$ Land	$ Misc.†	$ Total	$/hp
New York	850	1,093,955	540,000	—	166,210	1,800,165	2,118
New York	1,000	698,350	304,450	—	227,946	1,230,746	1,231
Kansas	1,200	809,000	253,000	—	170,000	1,232,000	1,027
Texas	1,200	761,000	235,000	—	159,000	1,155,000	963
W. Virginia	1,320	774,000	481,000	—	348,170	1,603,170	1,215
Illinois§	2,000	2,031,000	1,378,000	—	4,499,832	7,908,832	3,954
Pennsylvania	2,600	2,860,000	750,000	—	302,500	3,912,500	1,505
New York	2,750	1,875,000	650,000	—	263,376	2,788,376	1,014
Kansas	2,940	1,321,000	331,000	60,000	338,000	2,050,000	697
Louisiana§	3,450	2,622,000	1,200,000	12,000	1,245,000	5,079,000	1,472
Connecticut§	3,830	3,533,000	1,520,000	—	3,576,723	8,629,723	2,253
New York	5,000	3,441,000	1,469,000	—	1,243,649	6,153,649	1,231
Utah	9,100	5,695,000	3,748,000	150,000	3,815,223	13,408,223	1,473
Nevada	9,900	5,608,000	4,366,000	155,000	4,050,216	14,179,216	1,432
New York	11,490	8,337,000	5,756,000	5,000,000	8,015,015	27,108,015	2,359
Michigan§	12,500	5,525,000	3,332,000	—	1,322,000	10,179,000	814
Iowa	13,800	8,621,000	2,630,000	—	7,009,490	18,260,490	1,323
Michigan§	15,000	6,669,000	3,735,000	—	1,543,000	11,947,000	796
Illinois	16,000	8,486,000	3,617,000	—	3,184,000	15,287,000	955
Wyoming	17,200	9,844,000	6,470,000	150,000	6,713,225	23,177,225	1,348
Arizona-California	22,500	16,955,200	5,499,000	100,000	5,461,120	28,015,320	1,245

* All projects are onshore. † Includes engr., supv., inspection, surveying, interest, adm. & overhead, contingencies, and FERC fees. § Additions.
Source: U.S. FERC construction permit applications, 6/1/84—6/1/85.

Table 6

OPERATION EXPENSES	Expenses, $ 1982	Expenses, $ 1983	Cost/mile, $ 1982	Cost/mile, $ 1983	Cost/MMCf sold, $ 1982	Cost/MMCf sold, $ 1983
Supervision and engineering	141,667,636	145,623,437	496.7	515.2	8.76	10.18
System control and load dispatching	26,937,184	28,891,885	94.4	102.2	1.67	2.01
Communication system expenses	21,133,359	21,302,402	74.1	75.4	1.31	1.49
Compressor station labor and expenses	245,224,618	240,240,464	859.7	849.9	15.16	16.80
Gas for compressor station fuel	1,136,827,934	885,171,599	3,985.5	3,131.5	70.30	61.87
Other fuel and power for compressor stations	54,769,416	51,707,988	192.0	182.9	3.39	3.61
Mains	202,598,884	191,421,063	710.3	677.2	12.53	13.38
Measuring and regulating station expenses	69,469,156	70,191,700	243.6	248.3	4.30	4.91
Transmission and compression of gas by others	1,520,610,117	1,868,017,788	5,331.0	6,608.5	94.03	130.57
Other transmission expenses	45,284,961	53,687,061	158.8	189.9	2.80	3.75
Rents	18,565,908	20,912,188	65.1	74.0	1.15	1.46
Total operation expenses	**†3,483,089,163**	**3,577,167,578**	**12,211.1**	**12,655.2**	**215.40**	**250.03**
MAINTENANCE EXPENSES						
Supervision and engineering	34,729,450	37,463,063	121.8	132.5	2.15	2.62
Structures and improvements	27,502,452	26,371,788	96.4	93.3	1.70	1.84
Mains	92,540,478	100,621,645	324.4	356.0	5.72	7.03
Compressor station equipment	192,251,979	180,222,025	674.0	637.6	11.89	12.60
Measuring and regulating station equipment	14,665,132	14,982,590	51.4	53.0	0.91	1.05
Communication equipment	12,521,643	13,020,822	43.9	46.1	0.77	0.91
Other equipment	4,788,221	4,739,973	16.8	16.8	0.30	0.33
Total maintenance expenses	**378,999,356**	**377,421,909**	**1,328.7**	**1,335.2**	**23.44**	**26.38**
Total transmission expenses	**†3,862,088,519**	**3,954,589,487**	**†13,539.8**	**13,990.4**	**†238.84**	**276.41**
Total miles of transmission pipeline	**285,239**	**282,664**				
Total natural gas sold, MMcf	**16,170,743**	**14,306,847**				

* U.S. interstate pipelines for calendar years 1982 & 1983. †Revised from initially published figures.
Source: Statistics of Interstate Natural Gas Pipeline Companies—1982 & 1983, U.S. Department of Energy.

Single point mooring around the world

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Angola	1968	Cabinda	Gulf	SBM	100,000	2-16"/CALM	77
	1979	Quinfuquena	Petrangol	EMH	150,000	2-16"	NA
	1980	Essungo	Texaco/Petrangol	IMODCO	250,000	2-24" & 1-16"/CALM	115
	1980	Cabinda	Gulf	SBM	55,000	1-4"/CALM	118
	1982	Takula	Gulf	SBM	300,000	1-12"/CALM	200
	1984	Palanca	Elf	SBM	250,000	S-Y CALM	148
	1985	Takula II	Gulf	SBM	319,000	CALM	72
Argentina	1970	Puerto Rosales	YPF	IMODCO	40,000	1-16" & 1-12"/CALM	59
	1975	Caleta Olivia	YPF	IMODCO	60,000	1-20" & 1-12"/CALM	113
	1979	Caleta Cordova	YPF	IMODCO	60,000	1-20" & 1-12"/CALM	89
	1980	Puerto Rosales	YPF	IMODCO	60,000	1-20" & 1-12"/CALM	NA
Australia	1970	Botany Bay	Maritime Services	SBM	120,000	3-12"/CALM	63
	1985	Jabiru	BHP	SBM	160,000	Turret/FPS	394
Bangladesh	1967	Chittagong	Chittagong Port Trust	IMODCO	45,000	1-12"/CALM	45
Brazil	1968	Tramandai	Petrobras	SMB	105,000	2-16"/CALM	71
	1970	Tramandai	Petrobras	SBM	200,000	1-24"/CALM	71
	1975	Garoupa	Perobras	CB & 1	53,000	NA	NA
	1975	Garoupa	Petrobras	CB & 1	53,000	NA	NA
	1976	Sao Francisco	Petrobras	IMODCO	200,000	2-20"/CALM	72
	1978	Garoupa	Petrobras	IMODCO	53,000	2-16"/CALM	410
	1978	Enchova 4	Petrobras	SBM	53,000	1-8"/CALM	410
	1979	Tedut & Tefran	CEC/Petrobras	SBM	200,000	2-20"/CALM	72
	1980	Arembepe	Tibras	SBM	4,000	1-16"/CALM	60
	1981	Pampo	Petrobras	SBM	53,00	1-16"/CALM	460
	1981	RJS 28A	Petrobras	SBM	53,000	1-16"/CALM	395
	1981	Badejo	Petrobras	IMODCO	53,000	2-10"/CALM	338
	1982	Corvina	Petrobras	SBM	53,000	2-8"/CALM	492
	1982	Garoupa	Petrobras	Bluewater	100,000	S-Y CALM	
Brunei	1971	Seria	Shell	SBM	150,000	2-16"/CALM	73
	1975	Seria	Shell	SBM	210,000	2-20"/CALM	67
	1981	Seria	Shell	Mitsubishi	313,000	1-20" & 1-16"/CALM	NA
Cameroon	1976	Kole	Elf Serepca	IMODCO	150,000	1-12"/CALM	80
	1979	Kole	Elf Serepca	Bluewater	250,000	1-24"/CALM	102
	1979	Limboth Point	Sonara	SBM	150,000	2-16" & 1-16"/CALM	75
	1981	Kole	Elf Serepca	IMODCO	250,000	2-24" & 1-16"/CALM	85
	1982	Victoria Marine	Total	EMH	280,000	CALM	183
Canada	1969	St. John, N.B.	Irving Oil	SBM	350,000	1-24" & 1-16"/CALM	149
Chile	1971	Quintero Bay	Enap	SBM	209,000	2-20"/CALM	154
China	1985	Weitzhou	Total	EMH	250,000	Fix tower	123
	1985	Bohai Bay	JCODC	Bluewater	100,000	FPSO/TOWSY	72
	1985	Weitzhou	CSOFL	SBM	250,000	Tank Conv.	250
Colombia	1985	Covenas	Occidental	Bluewater	120,000	CALM	80
	1985	Covenas	Occidental	Bluewater	350,000	CALM S-Y	110
Congo	1972	Djeno	Elf Congo	SBM	250,000	2-20"/CALM	75
Denmark	1971	Dan	Danbor	SBM	70,000	1-12"/CALM	150
	1979	Gorm	Danbor	SBM	70,000	2-12"/CALM	128
	1982	Frederickshaven	DDCS	SOFEC	35,000	2-20"/CALM	50
Dominican Republic	1971	Santo Domingo	Refineria Domincia	SBM	150,000	2-16"/CALM	85
Ecuador	1971	Esmeraldas	Gulf/Texaco	SBM	100,000	2-20"/CALM	124
	1971	Esmeraldas	Gulf/Texaco	SBM	100,000	1-24" & 1-20"/CALM	124
	1978	Esmeraldas	Texaco	IMODCO	100,000	1-24" & 1-20"/CALM	118

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Equatorial Guinea	1963	Bata	CEPSA	IMODCO	20,000	1-16″/CALM	39
Egypt	1968	Ras-el-Shaqiq	Wepco	SBM	100,000	2-16″/CALM	78
	1974	Suez	Sumed	SBM	120,000	2-20″/CALM	82
	1974	Alexandria	Sumed	SBM	120,000	2-20″ & 1-16″/CALM	85
	1974	Alexandria	Sumed	SBM	120,000	2-20″ & 1-16″/CALM	82
	1974	Alexandria	Sumed	SBM	120,000	2-20″ & 1-16″/CALM	82
	1976	Suez	Sumed	IMODCO	250,000	2-24″/CALM	80
	1976	Alexandria	Sumed	IMODCO	250,000	2-24″ & 1-20″/CALM	108
	1976	Alexandria	Sumed	IMODCO	250,000	2-24″ & 1-20″/CALM	108
	1976	Agami	EGPA	SBM	100,000	2-16″/CALM	98
	1978	El Alamein	Wepco	SBM	100,000	2-16″/CALM	70
	1980	Ras Budran	Suez Oil Co.	SBM	250,000	1-24″ & 1-20″/CALM	115
	1981	Suez	Sumed	SBM	500,000	2-24″ & 1-16″/CALM	118
	1982	Sidi Kerir	Sumed	IMODCO	250,000	2-20″ & 1-20″/CALM	108
	1983	Zeit Bay	SUCO	SBM	155,000	2-20″/CALM	82
	1983	Ras Shukeir	EGPC	SBM	100,000	CBM	
	1983	Wadi Feiran	Petrojet	NA	100,000	NA	
	1984	East Zeit Bay	Esso	IMODCO	85,000	CALM	200
	1984	Geisum	Conoco	IMODCO	100,000	ENG FPSO	
	1985	Sadat area	Petrojet	IMODCO	60,000	CBM	60
Falklands	1984	Port Stanley	M.O.D.	IMODCO	100,000	CALM	65
France	1968	Bay of Biscay	Elf	CFEM	100,000	NA	NA
	1973	Frontignan	Mobil	IMODCO	270,000	2-20″/CALM	102
Gabon	1965	Gamba	Shell	SBM	100,000	1-16″/CALM	63
	1967	Lucina	Shell	SBM	165,000	1-16″/CALM	112
	1979	Gamba	Shell	SBM	140,000	1-16″ & 1-10″/CALM	63
	1983	Inguessi	AMOCO	Bluewater	—		
	1980	Mayumba	Elf Gabon	Bluewater	70,000	1-4″/CALM	79
Ghana	1978	Bonsu	Agripetco	SOFEC	64,000	1-10″/CALM	79
India	1975	Bombay High	ONGC	SBM	100,000	1-16″ & 1-8″/CALM	240
	1975	Bombay High	ONGC	SBM	100,000	1-16″/CALM	240
	1977	Gulf of Kutch	IOC	SBM	300,000	2-24″/CALM	115
	1982	Bombay High	ONGC	IMODCO	2,500	SBBM	262
	1983	Bombay High	ONGC	IMODCO	150,000	1-16″/CALM	NA
	1984	Gulf of Kutch	IOC	IMODCO	100,000	CALM	101
	1985	Panna	ONGC	IMODCO	115,000	CALM	120
Indonesia	1970	Pang Kalan Susu	Pertamina	IMODCO	100,000	2-12″/CALM	NA
	1971	Balikappan	Union Oil	SBM	250,000	2-20″ & 1-16″/CALM	102
	1971	Java Sea	ARCO	McDermott	45,000	1-8″	NA
	1971	Java Sea	IIAPCO	IMODCO	55,000	2-12″/CALM	120
	1972	Java Sea	ARCO	IMODCO	133,000	1-12″ & 2-16″/CALM	135
	1972	Java Sea	IIAPCO	IMODCO	133,000	2-12″ & 2-20″/CALM	130
	1973	Djatibarang	Pertamina	IMODCO	150,000	3-20″/CALM	75
	1973	Ardjuna	ARCO	SBM	150,000	3-16″/CALM	138
	1973	Ardjuna	ARCO	SBM	200,000	2-16″/CALM	126
	1974	Bekapai	Total	SBM	100,000	2-8″/CALM	123
	1974	Ardjuna	ARCO	SBM	NA	SBS	140
	1975	Poleng	Cities Service	SBM	55,000	2-8″/SBS	180
	1976	Handil	Total	SBM	125,000	2-20″/CALM	105
	1977	Balongan	Pertamina	SBM	150,000	2-20″ & 1-16″/CALM	74
	1978	Udang	Conoco	SBM	93,000	2-8″/SBS	302
	1980	Cinta	IIAPCO	IMODCO	133,000	2-12″ & 2-20″/CALM	130
	1980	Semarang	Pertamina	SBM	17,000	1-16″/CALM	39
	1981	Krisna	IIAPCO	IMODCO	230,000	2-20″, 2-16″ & 1-6″/CALM	NA
	1981	Ardjuna	ARCO	SBM	56,000	1-6″/CALM	135
	1981	NA	LETJES	SOFEC	10,000	2-8″	60
	1981	Balikpapan	Pertamina	SBM	150,000	CALM	102
	1983	Lalang	BP	Bluewater	140,000	Yoke Tower	NA
	1983	Balongan	Pertamina	SBM	35,000	1-16″/CALM	46
	1983	Arun	Mobil	Bluewater	100,000	CALM	
	1984	Kakap	Marathon	SBM	140,000	SBM	290
	1985	West Madura	Kodeco	Bluewater	100,000	CALM	330
	1985	Kepiting	Conoco	Comb. Eng.	100,000	FPSO/CBM	330

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Iran	1970	Cyrus	Inac	SBM	140,000	2-16"/CALM	141
	1971	Iman Hasan	SIRIP	IMODCO	250,000	2-16"/CALM	82
	1983	Iman Hassan	NIOC	SBM	250,000	CALM	160
	1985	Bushire	Smit Tak.	SBM	150,000	CALM	118
Iraq	1981	Arabian Gulf	Brown & Root	IMODCO	270,000	2-24"	NA
	1981	Arabian Gulf	Brown & Root	IMODCO	270,000	2-24"	NA
	1981	Arabian Gulf	Brown & Root	SBM	270,000	2-24"	NA
	1981	Arabian Gulf	Brown & Root	SBM	270,000	2-24"	NA
Italy	1963	Fimicino	PURFINA	IMODCO	50,000	2-12"/CALM	49
	1963	Ravenna	SAROM	IMODCO	50,000	2-12"/CALM	NA
	1964	Fiumicino	PURFINA	Dalmine	100,000	1-16"/RMD	NA
	1970	Porto Torres	Sardoil	SBM	255,000	2-20"/CALM	101
	1972	Ancona	API	Lavore Adriatica Maritime	300,000	NA	NA
	1972	Genoa	Port Authority	CIDONIO	500,000	2-20" & 2-12"	NA
	1978	Nilde	Agip	SBM	80,000	1-6"/SALS	312
	1981	Rospo Mare	Elf Italiana	EMH	35,000	2-10"	NA
	1981	Genoa	C.A.P.	Technomare	270,000	SALM (Inv).	
	1984	Vega	Montedison	EMH	250,000	SALMRA	394
	1985	Mila	Montedison	Bluewater	70,000	CALM/SYFPS	90
	1985	Nilde II	Agip	IMODCO	80,000	SALMRA/ENG	312
	1985	Rospo Mare	Elf	SBM	140,000	FSO/turret	230
Ivory Coast	1980	Bouet	Societe Invoirienne de Raffinage	IMODCO	250,000	3-24"/CALM	164
	1981	Espoir	Phillips	Bluewater	240,000	1-12"/CALM	279
Japan	1961	Niigata	Shell	Niigata	100,000	1-20"/CALM	NA
	1963	Oita	Kyushu Oil	IMODCO	100,000	2-12"/CALM	177
	1965	Yokkaichi	Showa-Yokkaichi	Mitsubishi	100,000	2-16" & 1-16"/CALM	NA
	1965	Yokkaichi	Showa-Yokkaichi	Mitsubishi	100,000	2-16" & 1-16"/CALM	NA
	1965	Chiba	Maruzen Oil	IMODCO	100,000	3-12"/CALM	NA
	1967	Koshiba	US Army	IMODCO	100,000	2-12"/CALM	65
	1968	Hakozaki	US Army	IMODCO	100,000	2-16" & 2-12"/CALM	60
	1968	Kawasaki	Showa-Mitsubishi	Mitsubishi	265,000	2-24"/CALM	NA
	1968	Hakodate	Asia Oil	IMODCO	32,000	1-16"/CALM	49
	1968	Yokkaichi	Daikyo Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1968	Yokkaichi	Daikyo Oil	Mitsubishi	230,000	2-20"/CALM	NA
	1969	Toyama	Japan Sea Oil	IMODCO	150,000	2-16"/CALM	NA
	1969	Yokohama	Ogishima Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1969	Ube	Seibu Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1970	Atsumi	Chubu Electric	Mitsubishi	200,000	2-20"/CALM	NA
	1970	Himeji	Idemitsui Oil	IMODCO	220,000	2-20"/CALM	NA
	1970	Buckner Bay	Toyo Gasoline	IMODCO	100,000	2-16"/CALM	NA
	1970	Tengan	US Army	IMODCO	50,000	2-12"/CALM	70
	1971	Nakagusuki Bay	Esso	Esso, Van Houten	250,000	2-24"/SALM	85
	1973	Ube	Seibu Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1974	Kawasaki	Showa-Mitsubishi	Mitsubishi	300,000	2-20"/CALM	NA
	1975	Yokohama	Oghishima Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1976	Yokkaichi	Showa-Yokkaichi	Mitsubishi	300,000	1-20" & 1-20"/CALM	NA
	1981	Mutsu-Ogawara	JNOC	SOFEC	350,000	2-24"/SALM	145
	1983	Fuqui	JNOC	SOFEC	240,000	2-20"/SALM	148
Kuwait	1967	Ras Al Khafji	Arabian Oil	McDermott	150,000	1-16" & 1-12"	NA
	1972	Ras Al Khafji	Arabian Oil	McDermott	250,000	1-24" & 1-10"	NA
	1977	Mina-Al-Ahmadi	KOC	ETPM	532,000	2-24" & 1-16"/RMD	NA
	1980	Ras al Kahfji	Arabian Oil	Mitsubishi	300,000	CALM	NA
Lebanon	1985	Beruit	Elec du Liban	EMH	40,000	SALM	118
Libya	1962	Brega	Esso	Esso	100,000	Fixed Tower/ Loading Arm	NA
	1965	Ras-es-Sider	Oasis	SBM	100,000	3-16"/CALM	101
	1968	Zueitina	Occidental	SBM	100,000	1-24"/CALM	100
	1968	Zueitina	Occidental	SBM	150,000	2-24"/CALM	105
	1968	Zueitina	Occidental	SBM	150,000	2-24"/CALM	105
	1969	Brega	Esso	Esso Van Houten	300,000	1-24"/SALM	140

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
	1969	Ras Lanuf	Mobil	SBM	255,000	2-24"/CALM	96
	1969	Ras-es-Sider	Oasis	SBM	255,000	2-24"/CALM	101
	1974	Azzawiya	NOC	DBV/Woodfield	100,000	2-16"	NA
	1974	Azzawiya	NOC	DBV/Woodfield	30,000	1-8" & 1-10"	NA
	1976	Azzawiya	NOC	SBM	140,000	2-20"/SALM	85
	1976	Azzawiya	NOC	SBM	100,000	2-20"/SALM	98
	1979	Zueitina	Occidental	IMODCO	275,000	2-24"/CALM	99
	1980	Ras-es-Sider	Oasis	SBM	300,000	2-24"/CALM	102
	1983	Ras-es-Sider	Oasis	IMODCO	NA	CALM	NA
	1984	Marsa el Brega	Sirte Oil	SBM	300,000	CALM	148
Malaysia	1959	Miri	Shell	SBM	70,000	2-8" & 1-6"/CALM	48
	1959	Miri	Shell	SBM	70,000	2-12" & 1-16"/CALM	48
	1962	Miri	Shell	SBM	70,000	2-8" & 1-6"/CALM	48
	1962	Port Dickson	Shell	SBM	100,000	2-16"/CALM	90
	1963	Miri	Shell	SBM	70,000	2-12" & 1-6"/CALM	53
	1974	Labuan	Shell	SBM	313,000	2-20"/CALM	98
	1974	Tembungo	Exxon	SOFEC	94,000	1-10"/SALM	300
	1974	Pulai	Exxon	SBM	190,000	1-12"/SALM	240
	1977	Pulai	Exxon	SBM	166,000	SALS	216
	1978	Bintulu	Shell	SBM	210,000	2-20"/CALM	67
	1981	Trengganu	Petronas	SOFEC	85,000	2-20"/SALM	60
	1981	Trengganu	EPMI	SBM	250,000	1-24"/SALM	92
	1981	Trengganu	EPMI	SBM	250,000	1-24"/SALM	85
	1981	Paka	JGC Corp.	SOFEC	85,000	CALM	65
	1982	Port Dickson	Shell	Mitsubishi	100,000	CALM	
	1984	Lutong	Shell	SBM	125,000	CALM	77
	1984	Lutong II	Shell	SBM	125,000	CALM	77
Mexico	1973	Tuxpan	Pemex	IMODCO	60,000	2-16"/CALM	60
	1974	Tuxpan	Pemex	IMODCO	60,000	1-10" & 3-16"/CALM	67
	1976	Salina Cruz	Pemex	IMODCO	60,000	3-16" & 1-12"/CALM	75
	1976	Rosarito Beach	Pemex	IMODCO	60,000	1-20" & 2-16"/CALM	77
	1978	Rabon Grande	Pemex	IMODCO	150,000	1-16" & 2-20"/CALM	90
	1980	Cayo Arcas	Pemex	IMODCO	151,000	2-24" & 1-16"/CALM	144
	1980	Doc Bocas	Pemex	SBM	250,000	2-24" & 1-16"/CALM	93
	1981	Cayo Arcas	Pemex	SBM	250,000	2-20" & 1-16"/CALM	151
	1981	Dos Bocas	Pemex	SBM	250,000	2-24" & 1-16"/CALM	93
	1981	Salina Cruz	Pemex	Mitsubishi	250,000	2-24" & 1-16"/CALM	NA
	1981	Cayo Arcas	Pemex	EMH	285,000	2-20"/RMD	131
	1981	NA	Pemex	SOFEC	2,000	SBBM (21)	150
	1985	Unknown	Pemex	Mitsubishi	150,000	CALM	93
Morocco	1971	Mohammedia	RAPC	IMODCO	100,000	1-8" & 1-20"/CALM	72
New Caledonia	1977	Noumea	Le Nickel	SBM	100,000	1-20"/CALM	62
New Zealand	1971	Waipipi Point	Marcona Corp.	IMODCO	75,000	1-12"/CALM	64
	1972	Taharoa	New Zealand Steel	IMODCO	70,000	2-12"/CALM	77
	1976	Taharoa	New Zealand Steel	SBM	150,000	2-12"/CALM	105
Nigeria	1967	Lagos	Nidogas	IMODCO	2,000	1-3" & 1-4"/CALM	13
	1968	Escravos	Gulf	IMODCO	100,000	2-16"/CALM	70
	1968	Forcados	Shell	SBM	210,000	1-20"/CALM	83
	1968	Forcados	Shell	SBM	210,000	-124"/CALM	83
	1971	Qua Iboe	Mobil	IMODCO	255,000	2-24"/CALM	90
	1971	Forcados	Shell	SBM	313,000	1-24"/CALM	91
	1971	Bonny	Shell	SBM	313,000	1-24"/CALM	91
	1971	Bonny	Shell	SBM	313,000	1-24"/CALM	91
	1972	Brass River	Agip	IMODCO	200,000	2-20"/CALM	96
	1974	North Apoi	Texaco	SBM	50,000	2-20" & 1-12"/CALM	'87
	1974	North Apoi	Texaco	SBM	250,000	2-20"/CALM	93
	1976	Brass River	Agip	IMODCO	250,000	2-20"/CALM	95
	1977	North Apoi	Texaco	SBM	250,000	2-24"/CALM	94
	1977	Escravos	Gulf	SBM	300,000	2-24"/CALM	102
	1979	Qua Iboe	Mobil	IMODCO	300,000	2-24"/CALM	95
	1984	OPL 98 Block	Ashland	SBM	285,000	S-Y Jacket	140
	1985	Bonny	Shell	Bluewater	350,000	CALM	92
Norway	1970	Ekofisk	Phillips	SBM	60,000	1-12"/CALM	232
	1970	Ekofisk	Phillips	SBM	150,000	1-12"/CALM	208
	1976	Statfjord	Mobil	CFEM	125,000	2-20"/AC	NA
	1979	Statfjord B	Mobil	SBM	150,000	1-20"/ALP	480
	1982	Statfjord C	Mobil	SBM	150,000	1-20"/ALP	478

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Oman	1963	Mina-al-Fahal	P.D. Oman	SBM	100,000	2-8"/CALM	71
	1966	Mina-al-Fahal	P.D. Oman	SBM	165,000	2-16" & 1-8"/CALM	115
	1966	Mina-al-Fahal	P.D. Oman	SBM	165,000	2-20" & 2-8"/CALM	124
	1973	Mina-al-Fahal	P.D. Oman	SBM	500,000	2-20" & 2-8"/CALM	155
	1979	Mina-al-Fahal	P.D. Oman	SBM	350,000	2-20" & 2-12"/CALM	124
	1984	Kuria Muria	Shell	SBM	250,000	CALM	125
Panama	1981	Chiriqui Grande	Petroterminal de Panama	EMH	150,000	2-20"/CALM	NA
	1981	Chiriqui Grande	Petroterminal de Panama	EMH	150,000	2-20"/CALM	NA
	1983	Chiriqui Grande	Petroterminal de Panama	EMH	150,000	2-20"/CALM	NA
Philippines	1967	Subic Bay	US Navy	IMODCO	108,000	2-16" & 1-10"/CALM	85
	1978	Nido	Cities Service	SBM	70,000	1-12"/CALM	200
	1980	Cadiao	Amoco	SBM	127,000	1-12"/CALM	300
	1980	Bataan	Bataan Refining	SOFEC	300,000	2-24"/SALM	94
	1982	Nido	Cities Service	Bluewater	55,000	2-10"/CALM	219
Qatar	1965	Halul	QGPC	SBM	100,000	2-16"/CALM	97
	1972	Halul	QGPC	McDermott	300,000	2-24"	NA
	1972	Umm Said	QGPC	IMODCO	300,000	1-20" & 1-24"/CALM	66
	1976	Doha	QGPC	SBM	65,000	1-6"/CALM	88
	1979	Halul	QGPC	SBM	540,000	2-20" & 1-10"/CALM	120
	1983	Umm Said	QGPC	IMODCO	500,000	CALM	NA
Saudi Arabia	1970	Zuluf	Aramco	SBM	250,000	2-24" & 1-16"/CALM	111
	1970	Zuluf	Aramco	SBM	450,000	2-24"/CALM	129
	1974	Ju'aymah	Aramco	McDermott	500,000	2-24" & 1-12"	NA
	1974	Ju'aymah	Aramco	McDermott	500,000	2-24" & 1-12"	NA
	1974	Ju'aymah	Aramco	McDermott	500,000	2-24" & 1-12"	NA
	1975	Ju'aymah	Aramco	SOFEC	750,000	2-24" & 1-12"/CALM	135
	1975	Ju'aymah	Aramco	SOFEC	750,000	2-24" & 1-12"/SALM	117
	1981	Ras Al Khafji	Aramco	Mitsubishi	300,000	1-24" & 1-10"/CALM	NA
Singapore	1971	Singapore Harbor	Esso	IMODCO	252,000	2-24"/CALM	88
	1974	Pulau Bukom	Shell	McDermott	300,000	2-24"	NA
	1980	Singapore Harbor	PSA	IMODCO	300,000	2-24"/CALM	105
South Africa	1969	Durban	Shell	SBM	210,000	2-20"/CALM	150
	1974	Durban	Shell	SBM	210,000	1-20"/CALM	150
South Korea	1963	Ulsan	KOC	IMODCO	75,000	2-12", 1-8" & 1-4"/CALM	65
	1969	Yosu	Honam Oil	IMODCO	100,000	2-16"/CALM	112
	1969	Ulsan	KOC	IMODCO	200,000	2-16" & 1-12"/CALM	88
	1977	Onsan	KIPCO	IMODCO	250,000	2-24"/CALM	90
	1980	Pusan	KOC	Mitsubishi	325,000	2-24" & 1-16"	NA
Spain	1966	Huelva	Rio Tinto	SBM	100,000	2-16"/CALM	75
	1971	Amposta	Shell	SBM	33,530	2-10"/CALM	209
	1973	Tarragona	Enpetrol	SBM	325,000	2-24" & 1-12"/CALM	135
	1975	Algeciras	Cepsa	DBV/Woodfield	500,000	2-20" & 1-12"	NA
	1976	Castellon	Shell	SBM	55,000	SALS	383
	1979	Badalona	Campsa	SOFEC	50,000	2-12"/SALM	107
Sri Lanka	1985		CPC	IMODCO	180,000	CALM	95
Sudan	1983	Marsa Nimeiri	Chevron	SBM	250,000	CALM (HEX)	160
Sweden	1959	Dalaro	Swedish Navy	IMODCO	3,000	1-4"/CALM	150
Taiwan	1967	Tai-Chung	US Air Force	IMODCO	50,000	1-12"/CALM	76
	1968	Kaohsiung	CPC	IMODCO	100,000	2-16" & 1-10"/CALM	68
	1968	Tai-Chung	US Air Force	IMODCO	50,000	1-12"/CALM	76
	1971	Kaohsiung	CPC	SBM	250,000	2-20"/CALM	100
	1972	Kaohsiung	CPC	SBM	250,000	2-20"/CALM	115
	1979	Chu-Wei	CPC	IMODCO	250,000	2-20"/CALM	121
	1981	Ta-Lin-Po	CPC	SBM	250,000	2-24" & 1-16"/CALM	130
Tanzania	1971	Dar-Es-Salaam	Tanzanian Harbour Authorities	SBM	100,000	2-20"/CALM	78

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
	1982	Dar Es Salaam	T.H.A.	IMODCO	300,000	CALM	
Thailand	1979	Gulf of Thailand	Union	Bluewater	70,000	1-8"/CALM Yoke	NA
	1981	Erawan	Union	Bluewater	85,000	1-8"/CALM	219
Trinidad	1971	Galeota Point	Amoco	SBM	250,000	2-20"/CALM	95
	1973	Point-A-Pierre	Texaco	IMODCO	260,000	1-12" & 2-24"/CALM	78
	1976	Galeota Point	Amoco	IMODCO	250,000	2-20"/CALM	95
Tunisia	1972	Ashtart	Aquitaine	SBM	70,000	SBS	220
	1974	Ashtart	Aquitaine	SBM	100,000	1-20"/CALM	220
	1978	Ashtart	Serept	SBM	137,000	1-20" & 1-10"/SBS	220
	1982	Tazerka	Shell/Tunirex	SBM	210,000	SALS	470
United Arab Emirates	1968	Fateh	Conoco	SBM	150,000	2-16"/CALM	103
	1972	Das Island	BP	IMODCO	300,000	2-24" & 1-16"/CALM	94
	1972	Fateh	Dubai Petroleum	McDermott	300,000	2-24"	NA
	1972	Mubarras Island	ADOC	SBM	200,000	1-24"/CALM	58
	1973	Mubarek	Crescent	SBM	350,000	2-20" & 1-16"/CALM	160
	1974	Abu-Al-Bu-Koosh	Total/ABK	SBM	100,000	2-12"/CALM	97
	1977	Das Island	ADMA	IMODCO	400,000	2-24" & 1-16"/CALM	94
	1977	Arzanah	Amerada Hess	SBM	252,000	1-12"/CALM	107
	1979	Fateh	Dupetco	IMODCO	120,000	2-20"/CALM	130
	1980	Zirku	Zadco	IMODCO	350,000	2-20" & 1-20"/CALM	95
	1980	Zakum Zirku	Zadco	IMODCO	350,000	2-20" & 1-20"/CALM	95
	1981	Sharjah	Amoco	SBM	300,000	1-20"/CALM	65
	1981	Abu-Al-Koosh	Total	EMH	232,799	1-10"	NA
	1983	Salah	Gulf Ras al Khaimah	IMODCO	300,000	CALM	100
United Kingdom	1965	Nore Estuary	BP	BP/Harland Wolff	100,000	NA	NA
	1970	Humber River	Conoco	SBM	210,000	1-24"/CALM	74
	1972	Auk	Shell/Esso	Shell/SBM	42,000	1-10"/ELSBM	280
	1973	Argyll	Hamilton Bros.	SBM	100,000	1-12"/CALM	252
	1975	Brent	Shell/Esso	Shell/HC	90,000	NA	NA
	1975	Anglesey	Shell	SBM	750,000	2-24" & 1-16"/CALM	127
	1975	Scapa Flow	Occidental	Micoperi	250,000	NA	NA
	1975	Scapa Flow	Occidental	Micoperi	250,000	NA	NA
	1975	Thistle	BNOC	SBM	80,000	2-16"/SALM	535
	1977	Brent	Shell	SBM	80,000	1-16"/CALM	460
	1978	Buchan	BP	IMODCO	107,000	1-12"/CALM	369
	1979	Ninian	Chevron	IMODCO	3,500	SBBM	433
	1980	Ninian	Chevron	IMODCO	3,500	SBBM(4)	433
	1982	Maureen	Phillips	EMH	85,000	1-16"/AC	NA
	1980	Humber River	Conoco	SBM	280,000	1-24"/CALM	74
	1982	Beryl B	Mobil	EMH	80,000	1-16"/ALP	NA
	1984	Cardigan Bay	M.O.D.	Havron	10,000	SPLM	100
	1985	Fulmar	Shell	Bluewater	100,000	ALPRA/HEAD	360
	1985	Beryl A	Mobil	EMH	100,000	ALP	
United States	1967	Louisiana	Kerr-McGee	McDermott	8,000	1-4"	NA
	1978	Worldwide (portable)	US Navy	IMODCO	70,000	2-10"/CALM	65-200
	1980	Louisiana	Loop	SOFEC	700,000	2-24"/SALM	110
	1980	Louisiana	Loop	SOFEC	700,000	2-24"/SALM	112
	1980	Louisiana	Loop	SOFEC	700,000	2-24"/SALM	114
	1981	Santa Ynez	Exxon	IMODCO	50,000	1-12", 1-8", 6-1" & 1-6"/SALM	494
Uruguay	1975	Jose Ignacio	Ancap	SBM	150,000	2-24"/CALM	64
	1985	Jose Ignacio	Ancap	SBM	150,000	CALM	64
Venezuela	1968	Moron	CVP	SBM	100,000	2-16"/CALM	63
Viet Nam	1984	White Tiger	Sudoimport	SBM	35,000	S-Y CALM	
West Germany	1962	Cuxhaven	West Germany Navy	IMODCO	2,500	1-4"/CALM	26
Western Sahara	1961	El Aaiun	CEPSA	IMODCO	3,000	1-6"/CALM	28
Zaire	1975	Zaire	Gulf	IMODCO	100,000	2-16"/CALM	71
	1976	Zaire	Gulf	IMODCO	79,200	2016"/CALM	79

Worldwide production statistics

NORTH AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Canada	23.5 1.2	79.6 4.0	525.6 26.2	801.4 39.9	1,263.6 62.9	1,321.0 65.8	1,324.0 65.9	1,496.0 74.5	1,412.0 70.3	1,287.0 64.1	1,233.0 61.4	1,396.0 69.5	1,430.0 71.2	1,453.0 72.4
Total	**3,730.9** **185.8**	**5,486.7** **273.3**	**7,580.2** **377.5**	**8,605.5** **428.5**	**10,893.6** **542.5**	**9,566.0** **476.4**	**10,025.0** **499.2**	**10,040.0** **500.0**	**9,981.0** **497.0**	**9,875.0** **491.8**	**9,888.0** **492.4**	**10,065.0** **501.2**	**10,180.0** **507.0**	**10,372.0** **516.6**

MIDDLE EAST

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Abu Dhabi	... ...	... ...	... ...	281.9 14.0	693.8 34.6	1,680.0 83.7	1,450.0 72.2	1,464.0 72.9	1,350.0 67.2	1,145.0 57.0	883.0 44.0	757.0 37.7	750.0 37.4	705.1 35.1
Dubai	... ...	... ...	... ...	... ...	... ...	320.0 15.9	360.0 17.9	354.0 17.6	349.0 17.4	358.0 17.8	357.0 17.8	327.0 16.3	324.0 16.1	348.0 17.3
Iraq	60.7 3.0	136.2 6.8	1,004.2 50.0	1,315.2 65.5	1,548.6 77.1	2,348.2 116.9	2,562.0 127.6	3,434.0 171.0	2,638.0 131.4	892.0 44.4	914.0 45.5	905.0 45.1	1,218.0 60.7	1,396.8 69.6
Kuwait	... ...	344.4 17.2	1,628.2 81.1	2,169.5 108.0	2,734.5 136.2	1,783.0 88.8	1,865.0 92.9	2,213.0 110.2	1,382.0 68.8	916.0 45.6	675.0 33.6	912.0 45.4	925.0 46.1	823.3 41.0
Oman	... ...	... ...	... ...	... ...	332.4 16.6	350.0 17.4	320.0 15.9	295.0 14.7	283.0 14.1	317.0 15.8	328.0 16.3	378.0 18.8	404.0 20.1	484.3 24.1
Ras Al Khaimah	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	5.8 0.3	9.1 0.5
Sharjah	... ...	... ...	... ...	... ...	... ...	30.0 1.5	24.0 1.2	13.0 0.6	10.0 0.5	9.0 0.4	7.0 0.3	35.0 1.7	62.0 3.1	66.1 3.3
Turkey	... ...	0.3 ...	7.0 0.3	29.7 1.5	67.9 3.4	65.0 3.2	50.0 2.5	56.0 2.8	44.0 2.2	46.0 2.3	45.0 2.2	45.0 2.2	41.0 2.0	41.5 2.1

AFRICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Algeria	...	...	182.7	551.6	1,029.1	1,152.3	1,161.2	1,175.0	1,016.0	750.0	750.0	686.6	608.0	643.3
	...	...	9.1	27.5	51.2	57.4	57.8	58.5	50.6	37.4	37.4	34.2	30.3	32.0
Cameroon	...	...	...	...	...	...	10.0	34.0	58.0	87.0	109.0	114.0	125.0	133.5
	...	...	...	...	...	...	0.5	1.7	2.9	4.3	5.4	5.7	6.2	6.6
Egypt	18.1	44.9	61.6	122.7	327.3	413.0	464.0	526.0	596.0	578.0	667.0	690.0	790.0	885.8
	0.9	2.2	3.1	6.1	16.3	20.6	23.1	26.2	29.7	28.8	33.2	34.4	39.3	44.1
Ivory Coast	...	...	...	...	...	...	...	...	...	7.0	9.0	24.0	22.0	28.0
	...	...	...	...	...	...	...	...	...	0.3	0.4	1.2	1.1	1.4
Nigeria	...	...	17.3	272.2	1,083.3	2,085.1	1,897.0	2,303.0	2,057.0	1,369.0	1,324.0	1,232.0	1,414.0	1,445.5
	...	...	0.9	13.6	53.9	103.8	94.5	114.7	102.4	68.2	65.9	61.4	70.4	72.0
Zaire	...	...	...	...	...	24.0	20.0	21.0	20.0	20.0	22.0	26.0	27.0	30.5
	...	...	...	...	...	1.2	1.0	1.0	1.0	1.0	1.1	1.3	1.3	1.5
Total	**18.1**	**45.7**	**285.0**	**2,211.9**	**5,969.4**	**6,277.2**	**6,001.5**	**6,638.0**	**6,032.0**	**4,360.2**	**4,454.7**	**4,333.2**	**4,672.7**	**4,838.4**
	0.9	**2.2**	**14.2**	**110.3**	**297.2**	**312.6**	**298.9**	**330.5**	**300.5**	**217.1**	**221.8**	**215.9**	**232.7**	**240.9**

EUROPE

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Austria	7.7	27.9	45.4	53.1	53.3	36.0	35.0	35.0	29.0	25.0	25.0	24.0	23.0	21.7
	0.4	1.4	2.3	2.6	2.7	1.8	1.7	1.7	1.4	1.2	1.2	1.2	1.1	1.1
France	1.4	2.5	38.6	59.5	45.8	20.0	21.0	20.0	26.0	34.0	33.0	32.0	35.0	49.0
	0.1	0.1	1.9	3.0	2.3	1.0	1.0	1.0	1.3	1.7	1.6	1.6	1.7	2.4
Greece	...	...	...	...	...	...	...	...	...	8.0	21.0	25.0	27.0	26.4
	...	...	...	...	...	...	...	...	...	0.4	1.0	1.2	1.3	1.3
Netherlands	...	13.4	36.0	37.0	35.8	30.0	36.0	25.0	25.0	27.0	28.0	42.0	61.0	69.0
	...	0.7	1.8	1.8	1.8	1.5	1.8	1.2	1.2	1.3	1.4	2.1	3.0	3.4
Spain	...	...	...	...	3.1	19.6	19.6	23.2	32.0	24.0	30.0	59.0	45.0	45.3
	...	...	...	...	0.2	1.0	1.0	1.2	1.6	1.2	1.5	2.9	2.2	2.3
Total	**29.7**	**67.1**	**266.5**	**353.3**	**313.2**	**1,254.6**	**1,683.6**	**2,206.2**	**2,394.0**	**2,555.0**	**2,825.0**	**3,206.0**	**3,500.0**	**3,882.4**
	1.5	**3.3**	**13.3**	**17.5**	**15.7**	**62.5**	**83.8**	**109.9**	**119.1**	**127.1**	**140.6**	**159.5**	**174.0**	**183.4**

Reviewing drill sites in Indonesia.

ASIA-PACIFIC

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Afghanistan	...	...	...	...	...	0.2	0.2	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Brunei	19.3	84.8	92.9	80.4	148.0	207.0	210.0	256.0	230.0	166.0	155.0	155.0	160.0	149.5
	1.0	4.2	4.6	4.0	7.4	10.3	10.5	12.7	11.5	8.3	7.7	7.7	8.0	7.4
India	3.9	5.1	9.0	61.8	138.6	200.0	230.0	245.0	182.0	298.0	384.0	390.0	543.0	614.0
	0.2	0.3	0.4	3.1	6.9	10.0	11.5	12.2	9.1	14.8	19.1	19.4	27.0	30.6
Japan	7.2	5.6	10.2	11.4	16.3	10.0	10.0	8.0	10.0	7.0	6.0	6.9	6.4	10.0
	0.4	0.3	0.5	0.6	0.8	0.5	0.5	0.4	0.5	0.3	0.3	0.3	0.3	0.5
New Guinea	...	4.8	4.2	...	...	...	...	...	...	...	...	...	...	...
	...	0.2	0.2	...	...	...	...	...	...	...	...	...	...	...
Pakistan	2.4	3.5	7.2	11.2	9.9	10.0	9.3	10.0	10.0	10.0	12.0	13.0	18.0	34.3
	0.1	0.2	0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.9	1.7
Taiwan	...	...	0.4	0.4	1.8	5.0	4.3	5.0	5.0	3.0	3.0	2.3	2.6	2.7
	...	...	...	...	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Total	**223.3**	**237.9**	**546.2**	**669.5**	**1,380.6**	**2,777.5**	**2,777.2**	**2,884.0**	**2,732.0**	**2,774.0**	**2,618.0**	**2,705.2**	**3,084.0**	**3,110.4**
	11.2	**11.9**	**27.2**	**33.5**	**67.7**	**138.3**	**138.3**	**143.5**	**136.0**	**138.0**	**130.2**	**134.4**	**153.5**	**154.9**

LATIN AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Argentina	56.3	64.0	171.9	269.3	382.9	431.0	453.0	467.0	487.0	497.0	483.0	481.0	467.0	447.5
	2.8	3.2	8.6	13.4	19.1	21.5	22.6	23.3	24.3	24.8	24.1	24.0	23.3	22.3
Brazil	...	0.9	80.9	94.0	160.5	162.0	160.0	161.0	182.0	215.0	252.0	315.0	437.0	540.5
	...	...	4.0	4.7	8.0	8.1	8.0	8.0	9.1	10.7	12.5	15.7	21.8	26.9
Colombia	69.9	93.3	152.7	210.0	214.0	140.0	130.0	124.0	125.0	125.0	140.0	155.0	165.0	178.8
	3.5	4.6	7.6	10.5	10.7	7.0	6.5	6.2	6.2	6.2	7.0	7.7	8.2	8.9
Guatemala	...	...	...	...	...	...	...	2.0	5.0	5.0	6.4	7.5	5.2	3.1
	...	...	...	...	...	...	...	0.1	0.2	0.2	0.3	0.4	0.3	0.2
Peru	33.2	41.1	52.6	63.2	72.2	90.0	150.0	195.0	191.0	184.0	198.0	171.0	201.0	189.0
	1.7	2.0	2.6	3.1	3.6	4.5	7.5	9.7	9.5	9.2	9.9	8.5	10.0	9.4
Venezuela	507.0	1,498.0	2,846.1	3,472.9	3,708.0	2,237.9	2,165.5	2,356.0	2,167.0	2,093.0	1,826.0	1,791.0	1,724.0	1,669.0
	25.2	74.6	141.7	173.0	184.7	111.4	107.8	117.3	107.9	104.2	90.9	89.2	85.9	83.1
Total	**854.8**	**1,962.9**	**3,727.8**	**4,818.5**	**5,162.6**	**4,512.3**	**4,758.0**	**5,259.0**	**5,585.0**	**6,017.7**	**6,102.0**	**6,078.0**	**6,225.4**	**6,332.6**
	42.5	**97.7**	**185.7**	**230.1**	**257.2**	**224.8**	**237.0**	**261.9**	**278.1**	**299.7**	**303.9**	**302.8**	**310.1**	**315.3**

COMMUNIST AREAS

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
Bulgaria	...	...	4.0	4.6	6.7	2.6	5.1	5.3	6.0	6.0	3.0	3.0	3.0	3.0
	...	...	0.2	0.2	0.3	0.1	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1
Czechoslovakia	...	0.8	2.7	3.9	4.1	2.5	2.3	2.2	1.9	1.7	2.0	2.0	2.0	2.0
	...	...	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hungary	...	10.1	24.3	36.1	38.7	44.0	44.1	40.7	40.6	40.5	41.0	40.0	40.0	40.0
	...	0.5	1.2	1.8	1.9	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Romania	...	87.7	231.0	252.4	268.6	294.2	275.6	247.0	230.9	232.0	234.0	240.0	229.0	226.0
	...	4.4	11.5	12.6	13.4	14.7	13.7	12.3	11.5	11.6	11.7	12.0	11.4	11.3
Yugoslavia	0.3	2.1	18.8	40.7	57.8	79.0	82.0	70.0	84.5	87.6	87.0	82.0	80.0	81.0
	...	0.1	0.9	2.0	2.9	3.9	4.1	3.5	4.2	4.4	4.3	4.1	4.0	4.0
Total	**625.2**	**872.3**	**3,369.7**	**5,461.8**	**8,011.9**	**13,323.4**	**14,043.4**	**14,320.8**	**14,580.0**	**14,645.4**	**14,764.0**	**14,908.0**	**14,975.0**	**14,849.0**
	31.1	**43.4**	**167.7**	**271.9**	**398.9**	**663.5**	**698.4**	**713.2**	**726.0**	**729.4**	**735.1**	**742.4**	**745.7**	**739.4**
World Total	**5,757.1**	**10,428.3**	**21,088.4**	**30,280.2**	**45,058.1**	**60,018.3**	**60,409.1**	**62,845.0**	**59,683.5**	**55,921.6**	**53,116.0**	**53,006.6**	**54,065.0**	**53,482.8**
	286.7	**519.3**	**1,050.1**	**1,508.0**	**2,243.9**	**2,988.9**	**3,008.3**	**3,129.3**	**2,972.0**	**2,784.6**	**2,644.5**	**2,639.2**	**2,693.6**	**2,663.9**

Low prices boost consumption at the pump.

World oil consumption

Upper figures = 1,000 b/d
Lower figures = million t/y

	1982	1983	1984
U.S.A.	14,765 705.5	14,745 704.9	15,150 723.9
Total North America	16,330 778.4	16,215 773.1	16,600 791.4
Total Western Hemisphere	**20,995 1,001.9**	**20,755 990.4**	**21,135 1,009.1**
Belgium & Luxembourg	475 23.3	435 21.1	425 20.6
Finland	230 11.3	215 10.5	215 10.6
Germany, Fed. Rep.	2,355 112.2	2,340 110.8	2,340 110.9
Ireland	95 4.6	85 4.2	85 4.1
Netherlands	655 31.0	620 29.1	635 28.9
Portugal	195 9.5	195 9.5	185 9.1
Sweden	440 21.8	375 18.2	355 17.1
Switzerland	235 11.2	255 12.3	250 11.8
Yugoslavia	280 14.1	270 13.5	290 14.5
Total Western Europe	12,500 604.9	12,240 586.6	12,335 591.0
Africa	1,650 78.3	1,645 79.3	1,700 82.4
Southeast Asia	2,270 113.5	2,290 114.5	2,350 117.6
Australasia	730 34.9	720 33.7	750 35.5
Eastern Europe	2,450 119.1	2,420 117.6	2,395 116.6
Total Eastern Hemisphere	**37,410 1,822.9**	**37,285 1,811.0**	**37,735 1,835.4**
World Total	**58,405 2,824.8**	**58,040 2,801.4**	**58,870 2,844.5**

Source: British Petroleum
South Asia—Afghanistan, Bangladesh, Burma, India, Nepal, Pakistan, Sri Lanka Southeast Asia—Brunei, Malaysia, Indonesia, Hong Kong, South Korea, Philippines, Singapore, Thailand, Taiwan, Australasia—Australia, Papua New Guinea, New Zealand, SW Islands

Worldwide refining capacity

EUROPE

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Austria	...	26	47	98	280	280	280	280	280	244	269	268	273	204
	...	1.3	2.3	4.9	13.9	13.9	13.9	13.9	13.9	12.2	13.4	13.3	13.6	10.2
Cyprus	...	...	...	...	15	15	15	16	16	16	16	15	16	16
	...	...	...	...	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8
Finland	...	...	25	176	336	336	336	336	336	299	299	299	299	241
	...	...	1.2	8.8	16.7	16.7	16.7	16.7	16.7	14.9	14.9	14.9	14.9	12.0
Germany, Fed. Rep.	48	81	573	2,351	3,075	3,081	3,103	2,986	3,021	2,937	2,471	2,386	2,172	1,933
	2.4	4.0	28.5	117.1	153.1	153.4	154.5	148.7	150.4	146.3	123.1	118.8	108.2	96.3
Ireland	11	...	40	54	56	56	56	56	56	56	56	56	56	56
	0.5	...	2.0	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Netherlands	15	77	359	1,456	2,031	1,869	1,857	1,828	1,827	1,708	1,552	1,552	1,499	1,468
	0.7	3.8	17.9	72.5	101.1	93.1	92.5	91.0	91.0	85.1	77.3	77.3	74.7	73.1
Portugal	4	8	23	82	190	415	361	378	341	365	365	282	290	296
	0.2	0.4	1.1	4.1	9.5	20.7	18.0	18.8	17.0	18.2	18.2	14.0	14.4	14.7
Sweden	4	26	48	253	435	424	411	458	451	471	453	453	439	429
	0.2	1.3	2.4	12.6	21.7	21.1	20.5	22.8	22.5	23.5	22.6	22.6	21.9	21.4
United Kingdom	133	197	962	2,420	3,014	2,911	2,527	2,527	2,629	2,482	2,260	2,092	2,007	1,792
	6.6	9.8	47.9	120.5	150.1	145.0	125.8	125.8	130.9	123.6	112.5	104.2	99.9	89.2
Total Europe	**438**	**871**	**3,976**	**14,657**	**20,859**	**20,728**	**20,329**	**20,242**	**20,206**	**19,743**	**17,424**	**16,530**	**15,952**	**14,374**
	21.5	**43.1**	**197.9**	**730.1**	**1,038.6**	**1,032.2**	**1,012.3**	**1,007.9**	**1,006.2**	**983.3**	**867.8**	**823.3**	**794.5**	**716.0**

NORTH AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Canada	203	329	1,002	1,355	2,100	2,126	2,225	2,222	2,168	2,200	2,020	1,807	1,869	1,856
	10.1	16.4	49.9	67.5	104.6	105.9	110.8	110.7	107.8	109.6	100.6	90.0	93.1	92.4
Total	**4,863**	**7,025**	**11,402**	**13,434**	**18,030**	**18,297**	**19,375**	**19,942**	**20,638**	**20,900**	**18,820**	**17,737**	**17,269**	**17,038**
	232.2	**348.9**	**567.8**	**668.0**	**897.9**	**911.2**	**964.9**	**993.2**	**1,027.8**	**1,040.9**	**937.2**	**883.3**	**860.0**	**848.5**

AFRICA

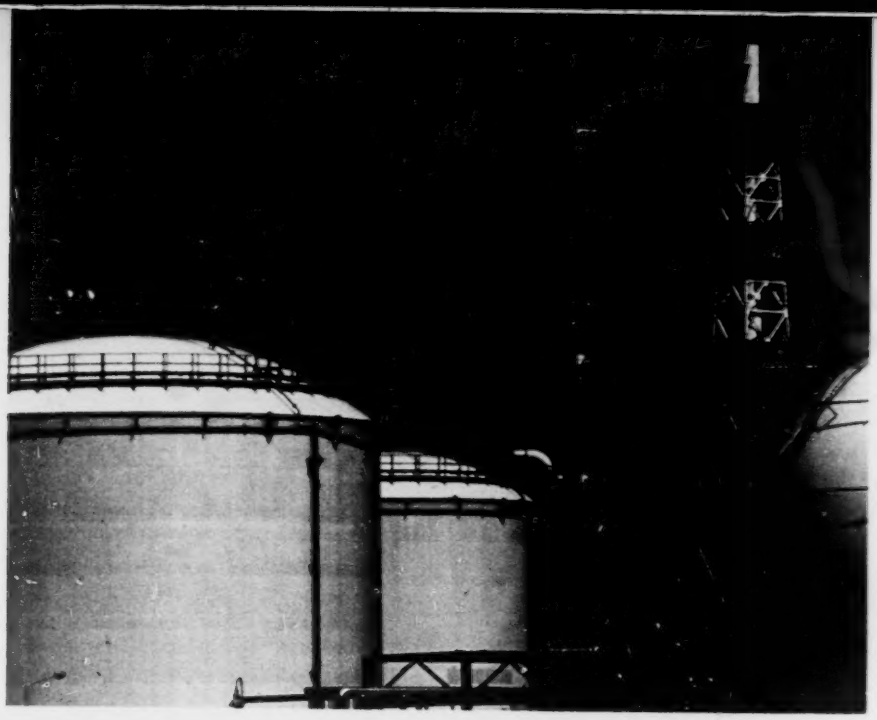
Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Algeria	...	...	...	47	122	122	122	122	122	122	137	137	464	465
	...	...	...	2.3	6.1	6.1	6.1	6.1	6.1	6.1	6.8	6.8	23.1	23.2
Cameroon*	...	...	...	...	...	...	...	...	...	43	43	41	43	43
	...	...	...	...	...	...	...	...	...	2.1	2.1	2.0	2.1	2.1
Egypt	17	39	87	193	236	234	251	234	292	292	341	369	369	434
	0.8	1.9	4.3	9.6	11.8	11.7	12.5	11.7	14.5	14.5	17.0	18.4	18.4	21.6
Gabon*	...	...	...	...	20	20	20	20	20	20	20	20	20	23
	...	...	...	...	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Ivory Coast	...	...	...	19	75	39	39	50	50	50	90	90	90	90
	...	...	...	0.9	3.7	1.9	1.9	2.5	2.5	2.5	4.5	4.5	4.5	4.5
Liberia*	...	...	...	...	15	15	15	15	15	15	15	15	15	15
	...	...	...	...	0.7	0.7	0.7	0.7	0.7	.0.7	0.7	0.7	0.7	0.7
Madagascar*	...	...	...	...	...	...	11	11	11	11	16	16	16	16
	...	...	...	...	...	...	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8
Mozambique	...	...	...	20	11	11	16	16	16	16	16	17	17	17
	...	...	...	1.0	0.5	0.5	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Senegal	...	...	...	13	19	20	20	20	20	18	18	18	30	30
	...	...	...	0.6	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.5	1.5
South Africa	1	...	25	178	433	446	478	478	469	424	424	389	389	389
	...	...	1.2	8.9	21.6	22.2	23.8	23.8	23.4	21.1	21.1	19.4	19.4	19.4
Tanzania	...	...	...	14	12	12	17	17	12	14	17	17	14	14
	...	...	...	0.7	0.6	0.6	0.8	0.8	0.6	0.7	0.8	0.8	0.7	0.7
Tunisia	...	...	...	23	22	22	34	34	34	34	34	34	34	34
	...	...	...	1.1	1.1	1.1	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Others	...	...	...	87	41	41	35	35	35	35	35	35	35	35
	...	...	...	4.3	2.0	2.0	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7

LATIN AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Argentina	103 5.1	152 7.6	238 11.9	502 25.0	703 35.0	655 32.6	655 32.6	676 33.7	679 33.8	677 33.7	676 33.7	678 33.8	678 33.8	667 33.2
Barbados	... ...	... ...	... ...	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1
Brazil	4 0.2	12 0.6	156 7.8	575 28.6	1,118 55.7	1,161 57.8	1,209 60.2	1,205 60.0	1,402 69.8	1,407 70.1	1,219 60.7	1,301 64.8	1,305 65.0	1,305 65.0
Colombia	15 0.7	24 1.2	51 2.5	140 7.0	165 8.2	165 8.2	174 8.7	193 9.6	199 9.9	199 9.9	214 10.7	211 10.5	211 10.5	211 10.5
Cuba	4 0.2	7 0.3	87 4.3	93 4.6	122 6.1	122 6.1	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0
El Salvador	... ...	... ...	... ...	14 0.7	16 0.8	17 0.8	17 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8
Honduras	... ...	... ...	... ...	10 0.5	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7
Mexico	98 4.9	160 8.0	357 17.8	515 25.6	935 46.6	1,384 68.9	1,244 62.0	1,394 69.4	1,394 69.4	1,470 73.2	1,289 64.2	1,269 63.2	1,269 63.2	1,269 63.2
Nicaragua	... ...	... ...	... ...	21 1.0	15 0.7	15 0.7	15 0.7	14 0.7	14 0.7	14 0.7	14 0.7	15 0.7	15 0.7	15 0.7
Paraguay	... ...	... ...	... ...	5 0.2	5 0.2	5 0.2	5 0.2	7 0.3	8 0.4	8 0.4	8 0.4	8 0.4	8 0.4	8 0.4
Puerto Rico	... ...	... ...	84 4.2	155 7.7	283 14.1	284 14.1	284 14.1	284 14.1	284 14.1	284 14.1	123 6.1	121 6.0	121 6.0	121 6.0
Uruguay	5 0.2	16 0.8	28 1.4	40 2.0	46 2.3	43 2.1	43 2.1	40 2.0	40 2.0	45 2.2	45 2.2	45 2.2	45 2.2	45 2.2
Virgin Islands	... ...	... ...	... ...	220 11.0	728 36.3	728 36.3	728 36.3	728 36.3	728 36.3	640 31.9	600 29.9	600 29.9	545 27.1	600 29.9
Total	**854** **42.3**	**1,397** **69.4**	**2,841** **141.5**	**5,334** **265.3**	**7,916** **394.1**	**8,487** **422.9**	**8,501** **423.2**	**8,620** **429.2**	**8,712** **433.7**	**8,664** **431.3**	**8,018** **399.1**	**7,945** **395.6**	**7,695** **383.1**	**6,920** **344.4**



Singapore plant on Merbau Island.

ASIA-PACIFIC

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Australia	4 0.2	14 0.7	237 11.8	581 28.9	706 35.2	709 35.3	708 35.3	725 36.1	743 37.0	742 37.0	716 35.7	722 36.0	697 34.7	623 31.0
Brunei-Malaysia-Singapore	10 0.5	10 0.5	46 2.3	302 15.0	1,086 54.1	1,086 54.1	1,058 52.7	1,093 54.4	1,246 62.1	1,271 63.3	1,271 63.3	1,313 65.4	1,286 64.0	1,240 61.8
Guam*	... ...	... ...	... ...	... ...	30 1.5	30 1.5	30 1.5	44 2.2	44 2.2	44 2.2	44 2.2	44 2.2	44 2.2	... ...
Indonesia	170 8.5	203 10.1	274 13.6	268 13.3	428 21.3	528 26.3	528 26.3	528 26.3	445 22.2	498 24.8	341 17.0	387 19.3	631 31.4	636 31.7
Korea, South	... ...	... ...	... ...	175 8.7	424 21.1	475 23.7	542 27.0	601 29.9	607 30.2	755 37.6	755 37.6	776 38.6	776 38.6	782 38.9
Okinawa*	... ...	... ...	... ...	... ...	208 10.4	209 10.4	196 9.8	198 9.9	208 10.4	208 10.4	183 9.1	153 7.6	153 7.6	110 5.5
Philippines	... ...	... ...	22 1.1	180 9.0	251 12.5	253 12.6	253 12.6	253 12.6	246 12.3	286 14.2	286 14.2	286 14.2	286 14.2	216 10.8
Taiwan	... ...	... ...	28 1.4	129 6.4	425 21.2	425 21.2	425 21.2	425 21.2	515 25.6	515 25.6	515 25.6	515 25.6	543 27.0	543 27.0
Others	27 1.3	4 0.2	9 0.4	137 6.8	13 0.6	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...

MIDDLE EAST

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Abu Dhabi*	...	...	...	...	15	15	15	14	14	128	135	185	185	185
	...	...	...	...	0.7	0.7	0.7	0.7	0.7	6.4	6.7	9.2	9.2	9.2
Iran	333	502	495	702	780	911	921	921	1,121	530	530	530	530	530
	16.6	25.0	24.7	35.0	38.8	45.4	45.9	45.9	55.8	26.4	26.4	26.4	26.4	26.4
Israel	...	83	87	115	201	201	195	195	190	190	190	190	170	170
	...	4.1	4.3	5.7	10.0	10.0	9.7	9.7	9.5	9.5	9.5	9.5	8.5	8.5
Kuwait†	...	25	270	569	685	712	712	645	645	623	623	623	669	634
	..	1.2	13.4	28.3	34.1	35.5	35.5	32.1	32.1	31.0	31.0	31.0	33.3	31.6
Qatar*	...	...	...	...	9	10	11	11	13	13	12	63	56	56
	...	...	...	...	0.4	0.5	0.5	0.5	0.6	0.6	0.6	3.1	2.8	2.8
Syria	...	...	...	54	117	102	223	223	223	223	229	229	228	229
	...	...	...	2.7	5.8	5.1	11.1	11.1	11.1	11.1	11.4	11.4	11.4	11.4
South Yemen	...	...	120	178	169	143	143	175	175	178	178	130	178	162
	...	...	6.0	8.9	8.4	7.1	7.1	8.7	8.7	8.9	8.9	6.5	8.9	8.1
Total	**370**	**916**	**1,436**	**2,686**	**3,348**	**3,508**	**3,547**	**3,519**	**3,730**	**3,301**	**3,686**	**3,901**	**4,052**	**4,275**
	18.4	**45.5**	**71.4**	**133.7**	**166.5**	**174.7**	**176.6**	**175.2**	**185.8**	**164.5**	**183.7**	**194.3**	**201.9**	**213.0**

*Prior to 1977, included in others. †Includes Neutral Zone.

U.S.S.R.-EASTERN EUROPE-CHINA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
China	...	8	98	300	1,398	1,400	1,578	1,600	1,810	1,810	2,000	2,050	2,150	2,150
	...	0.4	4.9	14.9	69.6	69.7	78.6	79.7	90.1	90.1	99.6	102.1	107.1	107.1
Hungary	...	20	58	130	230	226	230	290	312	312	311	312	242	242
	...	1.0	2.9	6.5	11.5	11.3	11.5	14.4	15.5	15.5	15.5	15.5	12.1	12.1
Romania	...	182	260	356	490	508	533	608	617	617	617	617	617	617
	...	9.1	12.9	17.7	24.4	25.3	26.5	30.3	30.7	30.7	[illegible].7	30.7	30.7	30.7
Others	...	4	40	332	800	810	823	852	852	852	898	894	894	894
	...	0.2	2.0	16.5	39.8	40.3	41.0	42.4	42.4	42.4	44.7	44.5	44.5	44.5
World total	**6,617**	**11,656**	**24,468**	**49,218**	**74,896**	**76,187**	**78,171**	**79,514**	**81,378**	**81,379**	**77,157**	**75,185**	**74,763**	**72,253**
	328.8	**580.0**	**1,218.1**	**2,450.4**	**3,729.2**	**3,793.8**	**3,892.6**	**3,959.6**	**4,052.4**	**4,052.4**	**3,842.3**	**3,744.0**	**3,723.0**	**3,598.1**

Vital statistics on selected master limited partnerships*

	Units outstanding (Million) Total	Publicly held	1985 operating cash flow/unit† ($)	Domestic reserves§ Crude oil (MM bbl)	Nat. gas (bcf)	Reserve-production ratio Crude oil	Natural gas	Proved developed reserves as a % of total proved reserves Crude oil	Natural gas	Date formed	Type
Apache Petroleum	43.9	42.1	4.25	13.7	308.2	6.2	6.0	93.8	91.1	1-85	Roll up
Diamond Shamrock	42.5	5.0	3.50	15.6	225.8	6.8	6.4	65.4	96.6	8-85	Drop down
Enserch Expl.	76.3	11.3	2.50	17.0	773.8	7.1	10.3	91.2	89.9	4-85	Drop down
Freeport-McMoRan	46.6	6.3	3.35	12.5	403.9	4.6	9.3	88.8	86.2	4-85	Drop down
Lear Expl.	20.0	1.0	1.75	1.7	134.1	4.4	7.0	93.5	91.0	3-85	Drop down
Mesa L.P.	87.2	78.4	2.65	30.1	1370.0	8.5	16.0	99.3	99.0	12-85	Liquidation
NRM Energy	15.4	13.0	2.20	15.5	120.0	15.5	11.7	68.1	92.1	4-85	Roll up
OKC Ltd. Part.	20.4	18.0	2.25	4.4	32.8	3.5	5.6	52.3	60.9	5-81	Liquidation
Sun Energy	300.0	8.0	2.50	66.5	241.9	10.4	10.1	72.5	75.0	12-85	Drop down
Transco Expl.	58.1	11.6	4.30	17.2	442.3	3.5	5.6	91.9	73.8	7-85	Drop down
Union Expl.	220.0	7.5	3.00	178.0	2616.0	11.0	16.2	72.0	71.0	7-85	Drop down
Average					7.1	9.4	81.6	85.2			

* Those with more than $200 million in market capitalization. † Estimated. § Generally as of Dec. 31, 1984, with adjustments for sizable acquisitions and dispositions during interim period.

The new rules would not apply if the parent of the shell company guaranteed the junk bonds, if the companies involved had agreed to merge, or if the paper company had "substantial assets or cash flow."

The Securities & Exchange Commission has considered, and declined to act against several merger tactics: "junk bonds," "golden parachutes," "greenmail," and "white knight lock-ups."

"Golden parachutes" are lucrative retirement settlements for top officers of companies taken over, "greenmail" is the expensive purchase of stock to prevent a merger, and "white knight lock-ups" is the sale of key assets to another company to discourage a takeover by a third firm.

SEC commissioners said use of those tactics is dying out, due to regulations, court rulings, and free market forces.

The Reagan administration is expected to press for legislation to ease the antitrust laws which restrain mergers, which would be the first major rewrite of the antitrust laws since the early 1950s.

The administration wants a 5-year exemption from merger antitrust laws for industries injured or threatened by increasing imports.

And it wants to make it harder for courts to block mergers, providing the justices guidelines which require they determine there is "a significant probability" that the merger would permit the merged company to enage in anticompetitive action.

Quick profits

The stock market, increasingly consisting of financial managers handling funds as fiduciaries, has placed a premium on short term investment results.

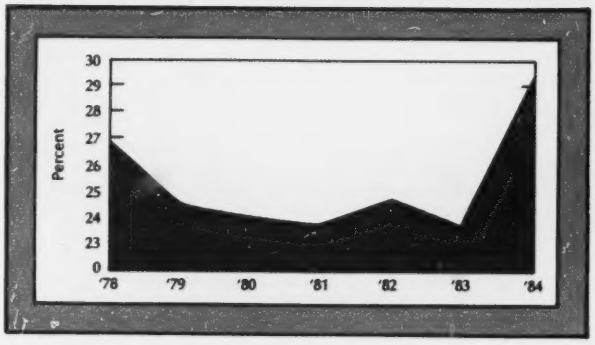
One reason for this is the simple fact that money managers are expected to produce immediate returns on the funds they invest for others.

This has made them favor dividends—or even better, liquidation—over reinvestment for long-term growth, certain cash over long-term risks.

There's also an economic reason for the market to be oriented to the short term. It's wary of the long term because it fears that because of the mammoth federal budget deficit the government ultimately will pump dollars into the economy, reigniting inflation.

That risk, when built into present value calculations of expected future earnings, makes long-term investments unattractive. Thus the market demand for immediate recognition of asset values.

Debt to debt-plus-equity ratios



Those two factors—an increasing share of corporate ownership in the hands of fiduciaries and inflationary fears—are impacting all U.S. industries, not just oil.

But petroleum investments are by nature long-term ventures. At present, capital markets, seeing mediocre returns from current investments, fear that long-term results from continued investment will be no better, given discovery trends and price prospects.

With the so-called outyears off limits for these reasons, attendant restructuring becomes a more rigorous process than it is in industries oriented more to the short term.

To the extent this short-term focus curbs exploration and production investments, it guarantees reduced petroleum supplies in the future.

Too much equity

And the market is telling oil companies to shrink.

Kurt H. Wulff, vice president of Donaldson, Lufkin & Jenrette Securities Corp., even told a House subcommittee there should be a law to "promote financial restructuring to improve the efficiency of the U.S. oil and gas industry by $100 billion."

His reasoning says much about the capital markets' aspirations for the oil industry.

For the 200 oil companies tracked by his firm, an active

OGJ 400

Rank by total assets	Company	Total assets ($000)	Rank	Total revenue ($000)	Rank	Net income ($000)	Rank	Stockholders' equity ($000)	Rank	Capital & Expl. spending ($000)
1	Exxon Corp.	63,278,000	1	97,288,000	1	5,528,000	1	28,851,000	1	9,755,000
2	Mobil Corp.	41,851,000	2	60,474,000	6	1,268,000	3	13,624,000	4	3,806,000
3	Texaco Inc.	37,744,000	3	47,935,000	16	306,000	4	13,107,000	5	3,744,000
4	Chevron Corp.	36,358,000	4	29,207,000	4	1,534,000	2	14,763,000	7	2,902,000
5	Amoco Corp.[1]	25,734,000	5	29,008,000	2	2,183,000	5	12,524,000	2	4,630,000
6	Shell Oil Co.	23,729,000	8	20,898,000	3	1,772,000	6	12,512,000	3	3,927,000
7	Atlantic Richfield Co.	22,130,000	6	24,654,000	12	567,000	7	9,948,000	6	3,257,000
8	Tenneco Inc.	18,205,000	12	14,960,000	10	631,000	10	6,179,000	11	1,748,000
9	Standard Oil Co. (Ohio)	17,487,000	13	12,251,000	5	1,488,000	8	8,390,000	9	2,329,000
10	Phillips Petroleum Co.	16,965,000	10	15,756,000	7	810,000	9	6,624,000	13	1,387,000
11	Sun Co.	12,789,000	11	15,397,000	13	538,000	12	5,272,000	8	2,377,000
12	Occidental Petroleum Corp.	12,273,084	9	16,237,563	11	568,691	13	2,903,569	15	1,091,240
13	Unocal Corp.	10,202,800	14	11,537,700	9	700,400	11	5,694,300	10	1,944,800
14	Marathon Oil Co.[2]	[3]9,949,000	15	10,185,000	8	[4]708,000	—	NA	17	727,000
15	Conoco Corp.[5]	[3]9,452,000	7	22,300,000	14	[6]458,000	—	NA	12	1,387,000
16	Amerada Hess Corp.	6,352,832	17	8,353,752	26	170,455	15	2,573,218	14	1,112,161
17	InterNorth Inc.[7]	6,122,042	18	7,600,248	17	296,816	16	1,802,224	18	648,548
18	Texas Eastern Corp.	5,757,357	20	6,194,239	22	212,358	21	1,537,879	22	507,760
19	Diamond Shamrock Corp.	5,396,400	23	4,532,400	19	242,200	14	2,708,800	19	635,500
20	Panhandle Eastern Corp.	5,369,112	33	3,212,362	27	166,488	20	1,633,783	43	255,152
21	Columbia Gas System Inc.	5,200,536	22	4,645,175	28	152,892	19	1,684,225	41	272,009
22	Williams Cos.	4,534,000	32	3,388,700	29	149,500	25	1,284,000	42	262,000
23	Pacific Lighting Corp.	4,242,928	21	4,849,489	31	138,571	37	799,983	20	567,355
24	Ashland Oil Inc.[8]	4,036,941	16	8,621,232	397	(172,478)	35	845,899	38	303,651
25	American Natural Resources Co.[9]	4,000,700	31	3,492,700	24	196,100	27	1,195,100	29	404,600
26	Mesa Petroleum Co.	3,955,951	76	413,489	18	270,184	39	741,594	64	109,278
27	Houston Natural Gas Corp.[11]	3,945,459	58	[12]842,299	68	[12]36,883	31	1,007,443	28	[12]413,652
28	Kerr-McGee Corp.	3,771,000	29	3,537,000	49	65,000	18	1,740,000	26	434,000
29	Transco Energy Co.[13]	3,676,856	26	3,644,400	32	138,008	33	867,013	21	512,200
30	Sonat Inc.	3,639,574	35	2,631,979	20	215,697	23	1,434,911	37	312,408
31	Consolidated Natural Gas Co.	3,505,715	30	3,519,324	23	208,875	24	1,416,885	30	394,160
32	MidCon Corp.[8]	3,475,080	24	4,159,668	30	145,528	29	1,160,087	36	327,951
33	Texas Oil & Gas Corp.[14]	3,443,005	43	2,094,440	15	346,205	22	1,508,166	16	768,679
34	Ensarch Corp.	3,362,734	28	3,544,717	35	118,829	28	1,173,824	34	372,003
35	Coastal Corp.[15]	3,295,733	19	6,260,378	38	101,716	47	577,886	52	153,542
36	Pennzoil Co.	3,242,837	37	2,348,676	33	130,509	26	1,212,174	33	372,200
37	Champlin Petroleum Co.[16]	[3]3,026,000	27	3,616,000	37	[6]110,000	—	NA	27	418,000
38	Union Texas Petroleum[17]	2,692,951	42	2,135,181	21	214,205	17	1,769,533	23	498,000
39	Murphy Oil Corp.	2,685,069	40	2,264,652	40	96,167	32	1,006,226	24	487,973
40	United Energy Resources Inc.	2,494,694	25	4,001,342	69	35,615	34	862,559	65	107,843
41	Nicor Inc.	2,384,573	36	2,419,430	398	(182,335)	43	597,604	50	175,193
42	Valero Energy Corp.	1,998,079	38	2,308,162	377	(16,144)	53	438,814	57	119,200
43	Mitchell Energy & Dev. Corp.[20]	1,981,396	57	930,708	47	72,778	48	518,770	44	253,924
44	Freeport-McMoRan Inc.	1,906,485	59	842,163	42	94,150	41	691,183	25	439,793
45	Global Marine Inc.	1,846,800	78	406,600	395	(91,200)	49	515,100	32	384,000
46	Mapco Inc.	1,792,668	45	2,031,505	34	125,633	38	760,956	61	114,247
47	Meridian Oil Inc.[21]	1,776,302	77	406,669	45	78,025	—	NA	47	221,412
48	Montana Power Co.	1,765,340	68	539,216	55	51,315	44	591,199	69	101,567
49	Cabot Corp.[8]	1,751,953	47	1,759,469	39	97,073	40	720,398	60	116,911
50	Fina Oil & Chemical Co.[22]	1,705,625	41	2,145,205	61	45,092	42	659,439	31	385,071
51	Arkla Inc.	1,667,660	52	1,180,705	50	63,752	52	465,469	61	116,836

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
1	590.0	1	1,622.0	1	6,474.0	1	29,785.0	1	285.0	1	977.0	3	2,715.0	1	17,884.0	1	1,279.0
6	217.0	2	1,164.0	6	2,440.0	2	21,922.0	8	113.0	4	607.0	8	1,041.0	4	8,092.0	7	752.0
2	374.0	3	1,053.0	2	3,249.0	5	9,590.0	4	210.0	2	944.0	5	1,887.0	7	6,539.0	3	1,037.0
8	174.0	7	519.0	8	2,073.0	8	6,448.0	7	115.0	7	443.0	7	1,328.0	9	4,583.0	8	743.0
3	310.0	4	1,019.0	5	2,618.0	3	15,202.0	6	149.0	3	694.0	6	1,737.0	3	9,684.0	5	899.0
7	200.0	5	596.0	7	2,436.0	6	7,703.0	5	195.0	5	590.0	4	2,321.0	5	7,455.0	2	1,160.0
4	261.0	6	566.0	3	2,941.0	4	15,087.0	2	240.0	6	524.0	2	2,746.0	2	14,288.0	9	598.0
16	50.00	9	435.0	16	369.0	11	3,545.0	14	36.00	8	435.0	15	252.0	11	3,539.0	11	372.0
5	232.0	35	56.90	4	2,903.0	7	6,972.1	3	232.0	32	56.90	1	2,903.0	6	6,972.1	6	792.5
10	114.0	8	473.0	10	1,110.0	10	6,114.0	10	62.00	11	286.0	11	659.0	10	3,925.0	13	341.0
13	82.00	11	319.0	13	896.0	13	3,211.0	9	71.00	10	287.0	9	745.0	12	2,728.0	30	123.0
11	113.0	13	258.0	12	1,011.0	15	2,607.0	15	30.00	12	249.0	14	263.0	14	2,385.0	12	360.3
14	71.00	10	409.0	14	853.0	9	6,194.0	12	59.00	9	325.0	10	663.0	8	4,824.0	15	302.0
12	94.73	14	216.2	11	1,081.4	12	3,242.9	11	59.75	16	144.2	12	575.6	17	1,758.2	14	314.0
9	131.0	12	307.0	9	1,390.0	14	2,868.0	13	44.00	13	248.0	13	366.0	15	2,182.0	17	279.5
15	61.00	15	178.0	15	699.0	19	1,879.0	16	26.00	22	98.00	16	228.0	25	880.0	44	79.0
31	8.111	34	57.14	25	86.34	24	1,092.9	53	2.583	38	48.94	43	20.18	23	940.1	61	55.1
29	9.237	32	60.94	18	179.1	33	712.2	116	0.539	64	16.24	110	5.143	72	135.8	78	35.4
18	26.84	21	119.5	20	144.1	28	933.2	32	5.369	21	103.1	30	37.71	26	799.6	18	241.4
38	4.906	24	83.17	47	22.71	21	1,402.4	36	4.463	23	81.68	47	19.08	19	1,354.9	26	140.2
61	2.531	25	81.61	66	14.46	29	906.1	58	2.133	25	79.81	70	10.21	29	755.1	55	61.0
90	1.100	99	8.900	129	3.800	115	79.40	81	1.100	91	8.900	123	3.800	104	79.40	83	32.0
45	3.741	89	11.23	38	37.71	101	95.73	40	3.519	87	9.805	32	34.08	111	70.71	27	140.0
32	7.900	92	10.80	37	39.70	73	161.6	86	0.900	83	10.80	108	5.200	65	161.6	34	103.0
74	1.466	54	27.48	53	19.29	54	306.0	66	1.466	52	27.48	46	[10]19.16	53	[10]256.0	56	59.5
39	4.818	23	103.9	40	31.53	22	1,370.0	34	4.737	20	103.2	35	30.07	20	1,343.3	51	67.4
122	[12]0.528	60	[12]20.57	98	7.895	48	383.9	117	[12]0.528	58	[12]20.57	87	7.895	42	383.9	66	43.6
24	15.40	30	68.10	26	85.10	40	520.3	25	7.100	30	65.30	25	45.30	38	457.2	53	64.0
43	4.186	31	67.25	60	16.11	42	512.1	37	4.186	29	67.26	54	14.65	43	377.0	50	69.1
51	3.284	50	35.80	97	7.952	71	172.1	44	3.284	48	35.80	86	7.952	63	172.1	87	30.5
56	2.714	19	127.0	62	15.85	25	1,013.0	49	2.714	17	127.0	52	15.85	21	1,013.0	10	455.1
58	2.704	39	48.97	46	23.88	52	349.7	51	2.704	37	48.98	39	23.88	46	349.7	37	100.0
36	5.744	16	177.2	39	32.85	20	1,639.8	30	5.744	14	177.2	33	32.85	18	1,639.8	4	947.0
27	10.86	29	76.26	28	67.38	31	776.3	23	10.83	27	76.27	21	64.59	28	776.3	35	102.3
55	2.724	26	80.10	54	18.53	27	985.1	48	2.724	24	80.11	48	18.53	22	985.1	84	31.8
25	13.00	17	163.0	22	126.0	26	995.0	21	13.00	15	152.0	18	125.0	24	920.0	29	129.0
19	25.10	20	121.7	17	179.1	18	1,896.4	17	25.10	18	121.7	17	179.1	16	1,896.4	25	144.0
17	31.00	18	159.0	19	155.0	17	2,449.0	26	7.000	31	65.00	23	48.00	32	589.0	33	116.0
20	20.80	33	60.50	21	136.5	34	695.7	31	5.500	34	53.20	31	35.30	41	394.0	69	40.8
73	1.483	62	20.01	81	9.587	68	207.3	71	1.343	60	19.97	82	8.482	62	202.0	74	38.0
85	1.200	65	17.80	102	7.500	77	149.9	80	1.100	67	14.90	92	7.200	81	125.0	75	37.8
6	[18]11.67	167	1.800	187	[19]1.400	145	35.30	22	[18]11.67	165	1.800	185	[19]1.400	139	35.30	148	13.9
3	16.70	36	56.00	23	114.7	37	606.4	19	16.70	33	56.00	19	114.7	31	606.4	32	117.3
9	2.700	46	38.50	65	14.50	36	607.4	52	2.700	44	36.80	60	12.80	39	456.5	130	16.0
155	0.285	156	2.287	150	2.700	134	48.42	151	0.285	153	2.287	144	2.700	128	48.42	165	10.8
0	4.703	85	12.00	61	15.94	326	1.000	38	4.138	79	12.00	57	13.37	326	1.000	—	NA
1	4.700	22	105.0	33	45.00	16	2,517.0	35	4.700	19	105.0	26	45.00	13	2,517.0	28	137.2
144	0.367	71	15.04	111	5.782	47	395.6	158	0.239	103	6.570	161	1.866	78	125.9	141	14.1
82	1.273	47	36.79	77	10.65	43	507.9	73	1.273	45	36.79	67	10.65	36	507.9	23	145.0
53	6.876	59	22.43	36	40.11	65	223.1	27	6.876	57	22.43	28	40.11	59	223.1	20	185.0
160	0.231	57	25.30	133	3.441	30	779.1	160	0.231	55	25.30	129	3.441	27	779.1	73	38.2

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52	Louisiana Land & Exploration Co.	1,545,500	50	1,281,300	41	95,300	45	590,300	35	329,500
53	Ocean Drilling & Exploration Co.	1,478,442	61	784,677	44	82,538	36	844,301	48	207,304
54	Grace Natural Resources Group[23]	[3]1,452,000	66	568,000	63	[6]44,200	—	NA	85	66,000
55	Primark Corp.	1,384,155	44	2,042,393	57	49,504	61	381,030	89	61,227
56	Zapata Corp.[8]	1,358,655	75	421,300	73	30,752	50	483,008	45	253,583
57	Transco Exploration Partners Ltd.[24]	1,322,678	73	430,246	59	47,108	30	[25]1,084,508	40	294,454
58	Tesoro Petroleum Corp.[8]	1,106,031	34	3,118,845	93	17,314	54	438,381	64	110,932
59	Reading & Bates Corp.	1,071,133	79	391,449	80	25,318	51	477,448	75	86,318
60	Santa Fe Energy Co.[26]	[27]1,065,700	69	515,700	36	[6]113,400	—	NA	46	252,600
61	Oneok Inc.[14]	1,029,922	53	1,168,579	62	44,264	60	391,597	86	63,289
62	Kaneb Services Inc.	994,917	65	583,847	393	(45,501)	63	360,953	59	117,818
63	Questar Corp.[28]	991,055	63	686,809	48	71,187	59	394,953	63	111,723
64	Total Petroleum (North America) Ltd.	983,496	39	2,274,156	95	16,453	69	287,666	79	76,029
65	Petro-Lewis Corp.[29]	947,815	84	302,421	390	(33,429)	72	254,270	82	69,786
66	Brooklyn Union Gas Co.[8,30]	937,314	55	1,036,233	54	54,299	65	326,870	80	75,246
67	Pogo Producing Co.	922,026	88	247,942	88	20,242	85	160,968	54	133,112
68	National Fuel Gas Co.	906,622	54	1,104,175	56	49,911	68	295,155	87	62,287
69	Montana Dakota Utilities Co.	894,662	74	425,800	75	29,882	78	219,391	115	36,550
70	Unimar Corp.[31]	862,790	102	[32]161,147	115	[32]6,286	90	136,179	116	35,970
71	Pioneer Corp.	854,186	71	462,286	25	175,509	58	395,709	88	61,912
72	Entex Inc.[29]	840,127	51	1,221,652	51	60,515	71	274,848	103	44,093
73	Hamilton Oil Corp.	824,906	91	207,940	94	16,884	73	249,708	39	303,547
74	Inexco Oil Co.	811,149	97	183,882	379	(19,274)	74	239,017	68	103,512
75	Apache Petroleum Corp.	802,525	89	221,132	74	30,516	46	[25]589,169	51	172,075
76	Celeron Corp.[33]	790,480	64	661,400	43	[6]89,000	—	NA	55	131,917
77	Noble Affiliates	768,194	86	282,241	90	17,781	56	424,032	53	152,672
78	Equitable Resources Inc.[34]	761,867	67	552,002	46	74,217	66	320,289	74	88,755
79	Tidewater Inc.[35]	722,280	80	335,083	152	1,610	62	365,796	70	97,106
80	Southern Union Co.	721,951	62	771,628	392	(39,300)	87	151,703	91	58,898
81	Lear Petroleum Corp.	710,396	72	440,796	81	24,716	79	212,941	81	74,264
82	CENEX (Farmers Un. Cent. Exch. Inc.)[8]	697,086	49	1,487,794	121	5,424	67	302,503	122	32,228
83	Tosco Corp.	694,926	46	1,899,347	399	(210,697)	376	(163,343)	146	18,308
84	Texas Gas Exploration Corp.[36]	674,715	83	309,404	64	42,070	64	333,257	49	186,909
85	Southland Royalty Co.	642,904	81	329,860	72	33,643	82	168,197	56	120,545
86	Helmerich & Payne Inc.[8]	610,011	96	192,576	85	21,439	57	418,163	78	77,574
87	Monsanto Oil Co.[37]	582,608	90	212,103	83	23,685	—	NA	58	119,000
88	Quaker State Oil Refining Corp.	573,095	56	934,952	92	17,756	70	275,615	83	68,223
89	Crown Central Petroleum Corp.	528,682	48	1,612,236	190	504	80	188,776	134	24,278
90	Madison Resources Inc.	513,912	131	61,987	198	355	55	427,723	99	46,073
91	Forest Oil Corp.	505,320	104	154,711	98	14,169	99	93,620	72	89,599
92	Yankee Companies Inc.[29,38]	505,176	115	100,792	113	6,843	145	28,928	203	5,596
93	KN Energy Inc.[39]	495,958	70	464,523	142	2,162	89	136,466	102	44,205
94	Wicor Inc.	489,634	60	823,842	78	25,741	86	156,492	124	31,465
95	Apache Corp.	489,256	111	115,608	86	21,276	75	227,524	105	42,421
96	BHP Petroleum (Americas) Inc.[40]	479,413	105	143,121	112	7,896	88	137,171	112	39,053
97	Crystal Oil Co.	459,825	93	198,150	382	(21,357)	180	13,952	73	89,520
98	Home Petroleum Corp.[41]	433,353	119	93,836	341	[6](2,409)	—	NA	114	38,465
99	Adobe Oil & Gas Corp.	426,123	100	166,964	79	25,460	76	224,604	84	68,212
100	Fluor Oil & Gas Corp.[42]	391,000	116	99,400	82	23,900	—	NA	101	44,900
101	Buttes Gas & Oil Co.	389,516	110	119,591	387	(28,979)	175	16,335	175	10,178
102	First Mississippi Corp.[29]	380,855	87	273,420	96	15,965	84	166,957	108	41,034

22	17.10	27	79.00	24	99.10	44	496.3	20	13.20	28	71.40	22	57.50	47	332.9	46	74.3
28	10.30	42	43.90	29	60.30	49	367.4	43	3.300	41	43.90	45	19.20	50	315.5	95	26.3
42	4.355	52	31.79	34	42.67	59	258.2	45	3.114	50	30.76	40	21.93	55	246.9	99	25.0
180	0.163	131	4.021	—	NA	143	37.00	180	0.163	129	4.021	—	NA	137	37.00	—	NA
150	0.309	110	6.738	135	3.414	93	113.3	155	0.259	118	5.090	145	2.493	113	70.06	89	29.2
37	4.912	28	78.91	57	17.19	46	442.3	33	4.912	26	78.91	50	17.19	40	442.3	49	69.1
68	1.824	169	1.796	103	7.197	130	51.69	105	0.612	167	1.796	133	3.182	164	22.46	115	20.0
47	3.470	101	8.639	58	16.97	109	89.90	98	0.729	105	6.473	77	8.587	105	78.35	128	17.5
21	17.70	53	28.29	31	47.45	122	70.15	18	17.70	51	28.29	24	47.45	112	70.15	19	218.3
124	0.513	87	11.63	139	3.247	96	110.5	118	0.513	81	11.63	132	3.247	86	110.5	126	17.6
84	1.206	69	15.69	92	8.418	86	130.0	75	1.206	65	15.69	83	8.418	76	130.0	160	12.0
57	2.710	48	36.36	64	15.40	41	514.4	50	2.710	46	36.36	53	15.40	35	514.4	82	32.0
52	3.140	80	13.00	45	26.01	60	254.8	64	1.610	93	8.250	93	7.170	124	52.13	124	18.1
34	6.189	56	25.95	35	41.84	66	216.9	28	6.189	54	25.95	27	41.84	60	216.9	59	56.1
260	0.046	184	1.245	284	0.267	152	31.60	259	0.046	181	1.245	283	0.267	49	316.0	81	33.6
44	4.094	41	45.23	50	20.73	56	282.1	39	4.094	40	45.23	41	20.73	51	270.2	88	29.3
252	0.054	109	6.793	206	0.958	100	97.08	251	0.054	101	6.793	203	^{10}0.958	90	^{10}97.08	121	19.0
80	1.400	215	0.755	93	8.200	82	137.0	69	1.400	214	0.755	84	8.200	71	137.0	105	24.0
78	^{32}1.418	44	^{32}40.84	48	21.81	23	1,259.0	92	^{32}0.786	95	^{32}7.657	73	9.580	98	87.97	110	22.7
111	0.643	37	51.63	127	3.808	35	607.8	104	0.643	35	51.63	121	3.808	30	607.8	97	25.9
125	0.500	120	5.600	144	3.000	158	28.00	121	0.500	116	5.600	138	3.000	152	28.00	—	NA
54	2.907	104	7.130	30	52.29	32	717.0	143	0.319	114	5.766	126	3.651	130	44.98	209	5.9
63	2.386	58	23.06	67	13.60	51	351.6	55	2.386	56	23.06	56	13.60	45	351.6	52	64.0
64	2.249	38	51.36	75	11.08	58	262.0	56	2.249	36	51.36	65	^{10}11.08	52	^{10}262.0	129	16.8
185	0.147	82	12.84	52	20.12	74	160.0	185	0.147	76	12.84	44	20.12	66	160.0	38	97.2
50	3.342	55	27.23	41	31.30	57	265.6	47	3.050	53	26.43	37	28.31	54	250.0	54	61.1
120	0.550	49	36.02	130	3.727	45	459.9	114	0.550	47	36.02	124	3.727	37	459.9	21	179.2
71	1.726	133	3.702	99	7.807	160	27.17	138	0.348	138	3.092	156	2.019	161	24.25	114	20.7
149	0.310	128	4.511	156	2.233	102	95.48	146	0.310	124	4.511	149	2.233	91	95.48	94	26.5
141	0.386	63	19.16	174	1.650	84	134.1	135	0.386	61	19.16	172	1.650	74	134.1	113	21.0
66	2.035	194	1.030	72	12.39	233	6.479	59	2.035	193	1.030	61	12.39	232	6.479	136	15.0
140	0.386	278	0.207	73	12.00	260	3.574	134	0.386	278	0.207	62	12.00	260	3.574	—	NA
30	8.780	45	40.42	71	12.54	67	215.7	24	8.670	43	40.42	64	11.51	61	215.7	77	36.0
35	6.163	40	48.38	27	69.66	38	585.4	29	6.163	39	48.38	20	69.66	33	585.4	24	144.4
89	1.110	77	13.66	74	11.64	61	236.9	79	1.110	72	13.66	63	11.64	56	236.9	98	25.1
46	3.608	51	34.07	32	46.00	39	578.2	42	3.421	49	32.38	29	38.30	34	520.5	31	121.0
75	1.463	136	3.558	51	20.51	123	69.69	67	1.463	133	3.558	42	20.51	114	69.69	16	298.0
86	1.189	100	8.676	89	8.545	105	92.05	76	1.189	92	8.676	79	8.545	94	92.05	164	11.0
76	1.444	142	3.032	70	12.83	149	33.14	124	0.476	142	2.811	114	4.379	146	29.89	131	16.0
102	0.761	43	42.25	119	4.522	53	342.2	100	0.713	42	41.57	117	3.946	48	317.5	96	26.2
295	0.024	262	0.292	253	0.451	199	13.60	295	0.024	262	0.292	252	0.451	194	13.60	43	79.0
337	0.011	361	0.021	351	0.068	360	0.372	337	0.011	361	0.021	351	0.068	360	0.372	202	6.3
–	NA	—	NA	329	0.110	325	1.000	—	NA	—	NA	329	0.110	325	1.000	—	NA
107	0.721	61	20.18	128	3.807	75	151.8	99	0.721	59	20.18	122	^{10}3.807	67	^{10}151.8	175	10.0
53	3.087	68	16.42	44	26.96	62	233.2	46	3.087	63	16.42	38	26.96	57	233.2	60	55.2
48	3.425	64	18.88	59	16.14	85	131.1	41	3.425	62	18.88	51	16.14	75	131.1	42	79.8
77	1.422	76	14.00	79	9.722	90	125.0	68	1.422	71	14.00	71	9.722	80	125.0	90	29.0
65	2.176	94	10.62	42	30.57	83	135.0	57	2.176	85	10.62	34	30.57	73	135.0	45	76.3
49	3.400	90	10.90	55	18.30	80	141.9	91	0.800	113	5.800	91	7.400	115	69.20	177	10.0
134	0.428	115	6.232	136	3.363	69	190.3	141	0.341	126	4.413	141	2.838	101	84.59	286	1.7
135	0.427	122	5.068	157	2.202	142	37.25	130	0.427	119	5.068	150	2.202	136	37.26	67	42.4

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Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
103	Sabine Corp.	323,815	113	106,403	109	8,952	77	220,999	67	104,346
104	Damson Oil Corp.[9]	323,676	114	101,561	97	14,219	105	87,941	109	39,569
105	DeltaUS Corp.	303,810	108	129,665	385	(24,405)	111	79,279	119	33,625
106	Primary Fuels Inc.[43]	298,244	127	70,601	245	(51)	—	NA	71	92,927
107	Texas International Co.	296,151	107	140,273	383	(21,959)	374	(119,097)	77	79,122
108	Tom Brown Inc.[35]	262,645	147	46,335	375	(13,389)	95	112,814	125	30,588
109	Canergy Corp.[26,44]	[3]261,399	128	66,392	106	[6]9,352	—	NA	107	41,263
110	MCO Resources Inc.	258,958	132	60,430	127	4,218	103	88,151	133	25,086
111	Ensource Inc.	237,681	140	51,038	137	3,116	109	81,288	111	39,240
112	NUI Corp.[8]	232,375	82	317,957	105	10,122	121	60,566	135	23,992
113	Woods Petroleum Corp.	231,526	118	94,889	89	18,281	91	132,530	113	38,518
114	Kaiser Energy Inc.[45]	229,183	157	36,019	118	[6]5,832	98	108,214	93	55,400
115	Gulf Energy Development Corp.[46]	221,582	98	178,390	128	4,112	107	85,692	140	22,800
116	Pelto Oil Co.[47]	216,093	123	76,203	70	[48]34,433	—	NA	94	54,600
117	Southwestern Energy Co.	212,196	117	96,958	87	20,832	110	80,803	104	43,620
118	Dyco Petroleum Corp.	210,608	141	50,977	108	[48]9,167	114	70,371	118	34,988
119	Depco Inc.[14,49]	208,200	112	109,700	53	54,800	—	NA	90	59,000
120	Universal Resources Corp.[50]	207,830	139	51,207	140	2,424	96	111,886	141	21,268
121	Kirby Exploration Co. Inc.	207,104	126	0,841	368	(7,184)	115	69,502	97	46,852
122	Oxoco Inc.	204,518	145	47,808	149	1,739	126	49,417	96	47,607
123	Prairie Producing Co.[51]	203,864	176	25,955	117	6,142	133	41,000	123	32,131
124	Amarex Inc.[52,53]	192,467	209	12,945	384	(22,989)	375	(155,607)	321	815
125	Howell Corp.	187,265	106	140,709	134	3,688	113	73,600	150	16,679
126	Texas American Energy Corp.	184,423	95	193,890	144	1,983	127	48,372	131	26,205
127	Park-Ohio Industries Inc.	182,812	94	195,314	119	5,739	102	90,217	159	13,821
128	Northern Michigan Exploration Co.[54]	181,111	120	90,107	103	10,569	93	125,638	92	58,013
129	INDREX/Quarles Drilling[55]	176,281	161	34,766	366	(6,562)	83	167,401	128	27,831
130	Houston Oil Trust	175,915	143	49,402	60	46,421	81	175,915	—	NA
131	Templeton Energy Inc.	167,908	189	19,124	148	1,743	112	78,247	197	6,558
132	Felmont Oil Corp.[57]	166,482	121	81,408	101	11,352	92	130,235	139	22,825
133	Moore McCormack Energy[58]	166,300	166	32,400	102	11,000	—	NA	121	32,300
134	American Quasar Petroleum Co.	163,874	162	33,969	388	(29,018)	366	(2,635)	155	15,201
135	Sage Energy Co.[59]	163,757	124	75,379	99	12,392	101	90,696	95	49,997
136	Bow Valley Petroleum Inc.[60]	163,539	154	39,524	352	(3,324)	117	65,366	136	23,934
137	Marion Corp.[28,53]	163,006	174	26,125	381	(21,036)	214	7,958	214	4,642
138	Wainoco Oil Corp.	162,522	148	45,453	159	1,324	144	29,747	163	13,105
139	Pyro Energy Corp.	161,844	109	128,685	91	17,779	120	63,516	152	16,055
140	Tricentrol PLC[59]	153,707	186	20,317	138	2,908	—	NA	130	26,564
141	Michigan Energy Resources Co.	148,295	99	171,322	132	3,868	142	31,122	161	13,380
142	Callon Petroleum Co.	146,752	153	40,328	123	4,704	134	40,287	149	17,446
143	Triton Energy Corp.[60]	145,857	177	23,925	100	12,302	104	87,957	110	39,383
144	Kenai Corp.[20,61]	144,974	144	48,603	389	(30,886)	136	36,998	172	10,585
145	Worldwide Pacific Corp.[62]	143,516	129	64,868	145	1,982	125	53,005	148	17,659
146	Tipperary Corp.[8]	134,748	138	53,861	391	(39,202)	131	41,635	132	25,650
147	Alleghany & Western Energy Corp.[28,63]	131,684	266	4,213	179	801	162	21,035	354	355
148	May Petroleum Inc.	126,722	165	32,435	378	(16,886)	116	67,663	164	13,081
149	Consolidated Oil & Gas Inc.[64]	123,235	163	33,210	124	4,694	199	10,213	153	15,521
150	Conquest Exploration Co.	123,163	170	28,378	131	3,884	108	85,068	76	82,456
151	Entex Energy Development Ltd.[53]	122,029	223	9,974	176	851	97	[25]110,508	207	5,198
152	Alamco Inc.	121,438	169	30,352	185	644	123	55,982	151	16,623
153	San Juan Basin Royalty Trust	117,959	155	38,775	67	38,345	94	[66]114,467	—	NA

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
67	1.900	72	15.00	69	12.90	89	125.2	60	1.900	66	15.00	59	12.90	79	125.2	36	101.1
101	0.778	108	6.795	112	5.626	92	114.3	93	0.778	100	6.795	103	5.626	84	114.3	123	18.5
128	0.463	114	6.290	134	3.428	120	73.97	125	0.463	108	6.290	130	3.428	109	73.97	80	34.5
98	0.839	79	13.20	115	5.304	94	112.0	95	0.752	74	13.20	107	5.304	85	112.0	65	44.0
60	2.619	70	15.24	63	15.44	88	128.2	54	2.503	75	13.18	55	14.19	100	85.91	40	89.1
87	1.175	141	3.053	68	13.29	126	65.25	77	1.175	139	3.053	58	13.29	118	65.25	109	23.0
112	0.611	107	6.879	125	3.869	125	66.49	106	0.611	99	6.879	119	3.869	116	66.49	122	18.7
103	0.759	84	12.33	116	5.179	91	120.2	94	0.759	78	12.33	109	[10]5.179	82	[10]120.2	104	24.2
113	0.604	98	8.986	107	6.427	87	128.7	107	0.604	90	8.986	99	6.427	77	128.7	102	24.8
276	0.034	216	0.749	277	0.325	227	7.146	275	0.034	215	0.749	276	0.325	224	7.146	108	23.0
79	1.410	66	17.04	83	9.329	70	183.7	70	1.349	68	14.71	88	7.807	83	116.0	71	39.3
157	0.251	116	6.127	186	1.407	78	143.4	156	0.251	109	6.127	184	1.407	68	143.4	48	71.0
229	0.079	168	1.796	263	0.388	176	17.93	228	0.079	166	1.796	262	0.388	171	17.93	179	10.0
108	0.708	73	14.62	106	6.507	107	90.97	101	0.708	69	14.62	98	6.507	96	90.97	132	15.5
168	0.208	74	14.42	188	1.387	63	230.1	168	0.208	70	14.42	186	1.387	58	230.1	58	58.6
175	0.180	93	10.70	214	0.847	121	73.10	174	0.180	84	10.70	211	0.847	110	73.10	200	6.4
62	2.400	75	14.10	49	20.80	64	227.4	63	1.800	88	9.400	68	10.50	117	65.30	76	37.5
99	0.828	102	7.713	114	5.404	114	79.48	89	0.828	94	7.713	106	5.404	103	79.48	68	40.8
151	0.302	132	3.808	142	3.068	164	26.38	147	0.302	130	3.808	136	[10]3.068	157	[10]26.38	354	0.2
126	0.490	124	4.768	145	2.955	146	35.15	122	0.490	120	4.768	139	2.955	140	35.15	169	10.6
136	0.407	138	3.515	95	8.004	127	64.10	131	0.407	135	3.515	85	8.004	119	64.10	137	14.7
208	0.103	159	2.225	159	2.140	128	57.61	206	0.103	156	2.225	152	2.140	122	57.61	302	1.3
97	0.856	130	4.114	78	10.45	113	80.66	88	0.849	131	3.764	69	10.22	120	63.97	186	8.5
121	0.547	143	2.993	110	5.975	165	25.63	115	0.547	140	2.993	102	5.975	158	25.63	64	46.3
170	0.203	126	4.654	131	3.590	99	105.1	170	0.203	121	4.654	127	3.590	89	105.1	72	39.0
70	1.800	97	9.000	94	8.100	129	57.10	62	1.800	89	9.000	94	7.100	123	57.10	47	71.0
184	0.148	191	1.124	225	0.720	162	26.69	184	0.148	189	1.124	222	0.720	155	26.69	85	31.0
105	0.736	88	11.39	138	[58]3.273	133	[58]49.19	97	0.736	82	11.39	131	[58]3.273	127	[58]49.19	197	6.9
173	0.193	137	3.556	146	2.918	72	165.9	172	0.193	134	3.556	140	2.918	64	165.9	252	2.8
104	0.739	83	12.45	120	4.450	104	92.37	96	0.739	77	12.45	113	4.450	93	92.37	79	34.8
117	0.581	144	2.978	88	8.558	132	50.17	112	0.581	141	2.978	78	8.558	126	50.17	167	10.7
127	0.480	129	4.457	165	1.890	97	108.4	123	0.480	125	4.457	160	1.890	87	108.4	223	4.5
81	1.336	118	5.971	84	9.087	139	38.17	72	1.336	111	5.971	75	9.087	134	38.17	41	88.9
94	0.934	135	3.647	87	8.701	140	38.03	84	0.934	132	3.647	76	8.701	135	38.03	151	13.6
59	0.234	188	1.199	147	2.819	180	16.91	159	0.234	186	1.199	142	2.819	177	16.91	263	2.3
23	0.519	81	12.95	137	3.276	55	293.5	145	0.310	128	4.065	190	1.271	132	39.43	257	2.5
163	0.227	155	2.346	203	1.049	179	17.05	161	0.227	151	2.346	200	1.049	176	17.05	133	15.5
214	0.092	127	4.637	258	0.410	119	74.38	211	0.092	122	4.637	257	0.410	108	74.38	119	19.1
270	0.039	263	0.280	248	0.528	297	1.735	269	0.039	263	0.280	247	0.528	297	1.735	204	6.2
110	0.669	139	3.210	126	3.839	168	23.78	103	0.669	136	3.210	120	3.839	163	23.78	103	24.5
138	0.400	174	1.579	96	8.000	170	21.81	153	0.284	174	1.424	154	2.052	199	11.52	158	12.3
187	0.145	208	0.815	228	0.665	220	8.568	187	0.145	205	0.815	226	0.665	218	8.568	228	4.4
91	1.088	91	10.81	85	8.974	110	87.88	120	0.507	152	2.287	104	5.536	148	29.19	153	12.8
145	0.350	178	1.453	118	4.843	157	28.14	137	0.350	173	1.453	112	4.843	151	28.14	154	12.6
195	(s)	300	0.133	373	0.028	175	18.79	395	(s)	300	0.133	373	0.028	170	18.79	295	1.5
172	0.193	105	7.054	219	0.743	135	46.10	171	0.193	97	7.054	216	0.743	129	46.10	159	12.0
14	0.602	125	4.664	104	6.859	76	151.1	111	0.590	123	4.541	96	6.702	69	142.7	93	27.6
142	0.383	123	5.032	158	2.149	144	36.16	136	0.355	127	4.374	151	2.149	138	36.16	144	14.0
189	0.139	166	1.831	143	3.024	156	28.59	189	0.139	164	1.831	137	3.024	150	28.59	299	1.4
150	0.056	150	2.645	292	0.234	118	75.09	249	0.056	147	2.645	291	0.234	107	75.09	57	58.6
138	0.065	78	13.53	175	1.642	50	366.1	237	0.065	73	13.53	173	1.642	44	366.1	101	24.9

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154	Pend Oreille Oil & Gas Co.[67]	113,127	130	62,028	77	26,605	—	NA	117	35,388
155	Wiser Oil Co.	112,295	135	56,476	111	8,095	100	91,998	129	27,583
156	Asamera Inc.[59]	112,077	85	286,654	372	[62](9,997)	—	NA	142	21,175
157	IMC Exploration Co.[28,69]	110,700	122	77,800	84	22,500	—	NA	184	8,026
158	Global Natural Resources Inc.	105,794	137	54,257	364	(5,968)	106	86,789	100	45,933
159	Unit Drilling & Exploration Co.	104,169	142	50,817	212	185	124	54,281	173	10,426
160	Argo Petroleum Corp.	102,727	171	26,821	294	(621)	161	21,467	167	11,156
161	Flag-Redfern Oil Co.	102,332	149	44,080	104	10,198	118	63,944	143	21,031
162	AMAX Petroleum Corp.[70]	102,233	125	74,248	71	34,347	—	NA	127	28,506
163	Seagull Energy Corp.	101,073	133	59,853	116	6,196	122	56,723	126	30,410
164	Marline Oil Corp.	97,116	225	9,696	386	(25,381)	173	16,684	106	42,073
165	Nicklos Oil & Gas Co.	96,778	168	30,434	380	(20,066)	132	41,160	212	4,775
166	Pauley Petroleum Inc.[14]	90,421	92	199,460	193	435	165	20,642	187	7,951
167	SPG Exploration Corp.[71]	83,251	159	35,186	343	(2,603)	—	NA	168	10,984
168	Galaxy Oil Co.	78,408	207	14,291	339	(2,265)	163	20,982	157	14,774
169	McCormick Oil & Gas Partnership[73]	77,511	160	35,003	110	8,556	176	[25]16,232	181	8,176
170	Magic Circle Energy Corp.	77,318	167	31,508	376	(13,894)	255	4,070	241	2,846
171	Maynard Oil Co.	71,754	164	33,145	334	(1,988)	141	31,336	145	18,620
172	OXC Limited Partnership	70,965	136	55,474	76	27,673	130	[35]43,482	169	10,795
173	Chieftain Development Co. Ltd.[58]	67,343	201	15,493	151	1,711	—	NA	144	20,147
174	Chapman Energy Inc.	67,289	206	14,452	141	2,374	151	26,271	171	10,695
175	Wilshire Oil Co. of Texas	66,277	191	17,151	133	3,751	168	20,085	185	8,012
176	Towner Petroleum Co.	65,504	182	22,110	396	(119,353)	373	(95,932)	233	3,262
177	LL&E Royalty Trust	63,934	152	42,474	65	41,766	119	[66]63,934	—	NA
178	Beard Oil Co.	62,465	151	42,845	189	553	186	12,934	158	13,826
179	Trinity Resources Ltd.	60,740	200	15,571	254	(113)	129	44,922	154	15,282
180	Ethyl Corp.[74]	[3]59,826	146	47,484	107	[75]9,322	—	NA	176	9,957
181	Federated Natural Resources Corp.	59,059	188	19,388	172	1,050	170	18,483	190	7,388
182	May Energy Partners Ltd.	58,181	213	12,252	143	2,092	140	[25]32,584	120	32,402
183	HCW Inc.[76,77]	57,662	195	16,566	114	6,711	139	33,269	202	5,756
184	Hadson Petroleum Corp.	56,638	194	16,739	157	1,360	150	26,873	137	23,901
185	Equity Oil Co.	56,345	184	21,594	125	4,400	135	38,230	170	10,709
186	GNC Energy Corp.[35]	55,768	156	38,698	355	(3,514)	183	13,784	274	1,626
187	Drillers Inc.[30]	55,180	228	9,360	122	4,739	154	25,382	303	1,119
188	Midland Southwest Corp.	54,464	181	23,023	373	(10,889)	174	16,537	227	3,625
189	Energy Ventures Inc.	53,637	190	17,460	165	1,127	147	27,662	340	540
190	McFarland Energy Inc.	53,169	192	17,026	129	3,994	138	33,601	147	17,776
191	Saxon Oil Co.	52,678	203	15,188	58	47,766	143	30,941	98	46,291
192	Snyder Oil Partners	52,299	193	16,944	136	3,571	128	47,728	138	23,339
193	Bracken Exploration Co.	47,624	199	15,714	349	(2,989)	171	17,733	174	10,367
194	Patrick Petroleum Co.	44,925	158	35,449	135	3,584	137	36,048	302	1,145
195	MacMillan Ring-Free Oil Co. Inc.	42,943	101	163,694	345	(2,623)	217	7,823	189	7,681
196	Fuel Resources Dev. Co. (FUELCO)[64,78]	41,016	219	10,392	161	1,223	164	20,676	243	2,720
197	Witco Chemical Corp.[79]	39,420	179	23,733	—	NA	—	NA	160	13,556
198	KenCope Energy Cos.[39]	38,976	180	23,034	214	153	148	27,347	200	6,041
199	Slater Petroleum Inc.[80]	38,970	197	16,168	328	(1,833)	149	27,186	166	12,220
200	Chinook Resources Inc.	37,269	218	10,782	178	804	212	8,014	162	13,252
201	Partners Oil Co.	36,479	227	9,415	362	(5,471)	246	4,792	266	1,776
202	Presidio Oil Co.[29]	36,346	233	8,046	169	1,107	156	23,764	216	4,418
203	Rocky Mountain Natural Gas Co. Inc.	35,631	175	26,112	173	1,029	192	11,677	218	4,304
204	MSR Exploration Ltd.[60]	35,516	214	12,121	147	1,743	152	26,084	215	4,492

115	0.601	95	10.26	161	2.022	138	40.06	108	0.601	86	10.26	155	2.022	131	40.06	—	NA
88	1.115	113	6.300	91	8.496	112	82.46	78	1.115	107	6.300	81	8.496	102	82.46	39	93.4
217	0.090	286	0.180	306	0.167	352	0.524	213	0.090	286	0.180	306	0.167	352	0.524	336	0.5
118	0.570	86	11.68	140	3.155	106	91.20	113	0.570	80	11.68	134	3.155	95	91.20	118	19.3
132	0.430	96	9.389	152	2.582	95	111.6	133	0.386	102	6.594	170	1.676	160	24.84	125	17.7
194	0.129	187	1.225	240	0.571	217	9.365	194	0.129	185	1.225	238	0.571	214	9.365	198	6.9
100	0.822	173	1.646	56	17.99	137	42.76	90	0.822	179	1.326	49	17.99	144	31.74	170	10.6
95	0.917	117	6.013	109	6.225	151	32.36	85	0.917	110	6.013	101	6.225	143	32.36	86	30.6
119	0.550	67	16.75	123	4.015	81	139.6	119	0.511	115	5.682	125	3.696	133	38.73	217	5.0
376	0.003	209	0.808	348	0.074	166	25.15	376	0.003	207	0.808	348	0.074	159	25.15	176	10.0
179	0.163	185	1.243	190	1.361	197	13.67	179	0.163	182	1.243	187	1.361	192	13.67	163	11.0
207	0.107	190	1.124	238	0.576	214	9.635	205	0.107	188	1.124	236	0.576	210	9.635	307	1.2
92	1.080	206	0.834	76	10.73	191	14.33	82	1.080	203	0.834	66	10.73	187	14.33	183	9.1
130	0.453	112	6.455	105	^{72}6.700	98	^{72}105.7	127	0.453	106	6.455	97	^{72}6.700	88	^{72}105.7	143	14.0
153	0.290	186	1.236	80	9.597	103	92.94	149	0.290	183	1.236	72	9.597	92	92.94	62	52.3
178	0.176	103	7.637	207	0.932	111	86.17	177	0.176	96	7.637	205	0.932	99	86.17	328	0.7
154	0.289	146	2.790	90	8.496	116	77.95	150	0.289	144	2.790	80	8.496	106	77.95	352	0.3
137	0.402	134	3.700	151	2.683	117	76.51	152	0.284	176	1.387	171	1.674	208	10.25	255	2.5
83	1.247	119	5.873	121	4.352	150	32.82	74	1.247	112	5.873	115	4.352	142	32.82	276	2.0
283	0.030	239	0.470	257	0.411	241	5.869	283	0.030	239	0.470	256	0.411	240	5.869	216	5.2
176	0.178	171	1.688	172	1.694	188	15.22	175	0.178	169	1.688	168	1.594	184	15.22	106	23.4
143	0.377	151	2.567	149	2.789	148	33.79	140	0.342	160	1.950	174	1.630	173	17.56	157	12.4
165	0.215	140	3.161	215	0.830	169	22.41	165	0.215	137	3.161	212	0.830	165	22.41	184	8.9
96	0.894	121	5.329	108	6.256	172	20.93	87	0.894	117	5.329	100	6.256	167	20.93	294	1.5
129	0.457	147	2.778	179	1.572	200	13.03	126	0.457	145	2.778	178	1.572	195	13.03	100	25.0
152	0.298	164	1.876	170	1.738	209	10.77	148	0.298	162	1.876	166	1.738	205	10.77	63	48.6
171	0.201	148	2.756	198	1.124	136	43.28	178	0.173	161	1.927	204	0.956	172	17.76	168	10.7
147	0.337	161	2.071	199	1.109	216	9.389	142	0.337	158	2.071	196	1.109	213	9.389	251	2.8
204	0.110	149	2.672	204	0.997	163	26.56	201	0.110	146	2.672	201	0.997	156	26.56	258	2.4
343	0.010	277	0.216	346	0.076	341	0.718	343	0.010	277	0.216	346	0.076	341	0.718	240	3.2
182	0.153	387	0.003	182	1.501	392	0.021	182	0.153	387	0.003	221	0.721	392	0.021	192	7.6
106	0.735	202	0.896	86	8.780	124	68.68	110	0.593	219	0.706	95	6.721	121	63.31	145	14.0
356	0.007	285	0.183	303	0.171	242	5.571	356	0.007	285	0.183	302	0.171	241	5.571	—	—
297	0.023	213	0.768	307	0.165	230	6.762	297	0.023	212	0.768	307	0.165	228	6.762	—	—
256	0.052	249	0.361	251	0.508	236	6.255	255	0.052	248	0.361	250	0.508	235	6.255	353	0.8
133	0.429	152	2.494	154	2.276	190	14.36	129	0.429	148	2.494	147	2.276	186	14.36	—	—
116	0.599	192	1.048	82	9.354	212	10.40	109	0.599	190	1.048	74	9.354	207	10.40	150	13.8
139	0.397	207	0.831	122	4.181	206	10.92	132	0.397	204	0.831	116	4.181	202	10.92	111	22.7
148	0.317	160	2.075	176	1.629	174	19.04	144	0.317	157	2.075	175	1.629	169	19.04	236	3.5
259	0.046	145	2.799	271	0.344	167	23.79	258	0.046	143	2.799	270	0.344	162	23.79	162	11.3
177	0.177	182	1.277	300	0.183	307	1.396	176	0.177	180	1.277	299	0.183	307	1.396	259	2.4
201	0.114	—	—	223	0.735	—	—	199	0.114	—	—	219	0.733	—	—	—	NA
222	0.086	153	2.478	213	0.860	79	142.7	221	0.086	149	2.478	210	0.860	70	142.7	185	8.8
109	0.685	181	1.337	100	7.629	203	11.74	102	0.685	178	1.337	89	7.629	198	11.74	22	169.0
288	0.028	242	0.409	308	0.163	269	2.989	288	0.028	242	0.409	308	0.163	269	2.989	117	19.8
158	0.243	170	1.786	168	1.805	159	27.80	157	0.243	168	1.786	163	1.805	153	27.80	120	19.0
156	0.262	189	1.139	205	0.962	187	15.49	154	0.262	187	1.139	202	0.962	183	15.49	195	7.1
195	0.128	193	1.042	237	0.577	225	7.330	195	0.128	191	1.042	235	0.577	223	7.330	253	2.7
192	0.133	177	1.461	224	0.724	153	30.90	192	0.133	172	1.461	220	0.724	145	30.90	171	10.6
72	^{78}1.600	302	0.129	—	—	302	1.600	65	^{78}1.600	302	0.129	—	—	302	1.600	—	—
188	0.139	282	0.191	178	1.612	239	5.975	188	0.139	282	0.191	177	1.612	238	5.975	112	22.0

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Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
205	Kimbark Oil & Gas Co.	35,470	237	7,667	197	364	169	18,714	186	7,970
206	Energy Management Corp.	34,740	210	12,937	374	(11,051)	371	(12,457)	211	4,794
207	Enertec Corp.	34,654	240	6,645	371	(9,942)	368	(8,405)	357	325
208	Hershey Oil Corp.	34,525	234	7,896	171	1,062	146	27,971	183	8,044
209	Jackson Exploration Inc.	34,407	178	23,909	194	426	236	5,454	209	4,863
210	Petrotech Inc.	33,906	222	10,156	174	897	230	5,930	165	12,448
211	Royal Resources Corp.[29]	32,131	204	14,685	130	3,948	155	24,665	177	9,901
212	Petroleum Investments Ltd.	32,117	224	9,806	363	(5,587)	158	[25]23,248	304	1,103
213	Tucker Drilling Co. Inc.[35]	31,252	173	26,324	223	90	159	22,587	198	6,365
214	Minden Oil & Gas Inc.[29]	30,575	245	6,057	353	(3,362)	179	14,090	206	5,200
215	Petroleum Development Corp.	30,036	202	15,220	303	(752)	208	8,579	294	1,244
216	Baruch-Foster Corp.	29,793	198	15,974	155	1,483	177	15,892	178	9,131
217	Bogert Oil Co.[8]	29,616	208	14,285	170	1,089	182	13,812	180	8,436
218	Adams Resources & Energy Inc.	29,463	103	155,058	126	4,359	369	(9,649)	252	2,199
219	Harkan Oil & Gas Inc.	29,306	220	10,299	365	(6,337)	201	10,031	256	2,141
220	Euratex Corp.	29,099	229	8,587	350	(3,077)	166	20,535	199	6,036
221	Summit Energy Inc.[77]	28,832	231	8,082	154	1,526	157	23,396	223	3,703
222	Texas Energies Inc.[52]	28,511	196	16,330	204	312	189	12,657	195	6,635
223	Shanley Oil Co.	28,413	187	20,224	330	(1,873)	204	9,587	217	4,342
224	Basic Earth Science Systems Inc.[35]	27,992	262	4,449	277	(390)	172	17,390	208	4,965
225	Equitable Petroleum Corp.	27,024	236	7,712	139	2,424	228	6,704	213	4,692
226	American National Petroleum Co.	26,389	212	12,571	153	1,555	184	13,443	300	1,167
227	High Plains Oil Corp.	26,351	283	3,261	279	(401)	153	25,445	222	3,994
228	Western Energy Development Co. Inc.	26,039	281	3,397	310	(914)	234	5,581	277	1,536
229	Brock Exploration Corp.[35]	25,465	230	8,580	231	32	254	4,116	249	2,342
230	ConVest Energy Corp.	25,086	226	9,611	263	(195)	195	11,100	267	1,770
231	Wichita Industries Inc.	24,403	216	11,092	316	(1,037)	222	7,079	196	6,562
232	Transcontinental Energy Corp.[53]	24,295	172	26,357	394	(90,305)	372	(72,336)	221	4,031
233	Arapaho Petroleum Inc.	23,758	265	4,286	344	(2,609)	200	10,138	270	1,685
234	Strata Corp.	23,515	211	12,861	370	(8,647)	256	4,023	324	771
235	Petrominerals Corp.	23,176	183	21,852	175	882	191	12,007	204	5,359
236	Valex Petroleum Inc.	23,143	273	3,706	213	169	160	21,619	238	2,978
237	Lomak Petroleum Inc.	22,912	185	21,538	324	(1,298)	300	2,068	229	3,379
238	Mid America Petroleum Inc.[14]	22,468	243	6,333	356	(4,038)	268	3,403	225	3,669
239	Premier Resources Ltd.[8]	22,233	235	7,893	327	(1,741)	261	3,681	263	1,829
240	Sabine Royalty Trust	21,152	150	42,871	66	41,238	167	[66]20,491	—	—
241	Alexander Energy Corp.[35]	21,081	276	3,607	186	619	187	12,796	219	4,179
242	Cambridge Royalty Co.	20,326	263	4,399	347	(2,697)	196	10,698	226	3,654
243	Bellwether Exploration Co.	19,660	215	11,130	166	1,126	215	7,934	192	7,015
244	Monogram Oil & Gas Inc.[50]	19,366	261	4,504	167	1,122	209	8,523	224	3,642
245	Ratex Resources Inc.[8,61]	18,949	257	4,743	325	(1,626)	367	(8,301)	246	2,447
246	Southland Energy Corp.[50]	18,736	260	4,533	266	(224)	223	6,957	188	7,605
247	Energy Oil Inc.[29]	18,558	249	5,246	177	830	247	4,714	182	8,119
248	American Frontier Exploration Inc.[29]	18,420	271	3,926	318	(1,119)	342	775	194	6,616
249	Sage Drilling Co. Inc.[29]	17,907	217	10,863	312	(923)	188	12,773	258	2,018
250	Argonaut Energy Corp.[35]	17,895	277	3,531	295	(636)	194	11,127	235	3,113
251	Resource Exploration Inc.[8]	17,586	238	7,598	181	702	185	13,264	220	4,000
252	Norris Oil Co.	17,469	293	2,672	331	(1,916)	197	10,554	318	819
253	American Exploration Co.	16,983	264	4,342	300	(682)	178	14,980	193	6,710
254	Cibola Energy Corp.	16,541	270	3,974	306	(838)	202	10,024	285	1,414
255	HLH Petroleum Corp.[35]	16,477	256	4,774	342	(2,447)	328	1,194	284	1,437

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
183	0.152	212	0.770	193	1.275	211	10.42	183	0.152	211	0.770	189	1.275	206	10.42	140	14.2
190	0.137	154	2.396	239	0.571	177	17.30	190	0.137	150	2.396	237	0.571	174	17.30	315	1.0
216	0.091	198	0.973	222	0.734	195	13.99	218	0.086	200	0.878	224	0.691	201	11.02	330	0.7
202	0.113	176	1.503	189	1.373	141	37.85	202	0.109	208	0.805	193	1.185	259	3.595	187	8.2
215	0.091	244	0.395	208	0.930	250	4.421	212	0.091	244	0.395	206	0.930	249	4.421	219	4.7
191	0.134	221	0.675	197	1.161	194	13.99	191	0.134	221	0.675	195	1.161	190	13.99	265	2.2
146	0.345	183	1.269	173	1.685	226	7.147	139	0.345	184	1.226	169	1.683	226	6.996	173	10.1
231	0.074	162	2.035	268	0.362	184	15.72	230	0.074	159	2.035	267	0.362	180	15.72	285	1.7
206	0.107	227	0.616	267	0.362	253	4.115	204	0.107	227	0.616	266	0.362	252	4.115	161	11.8
220	0.087	199	0.926	132	3.522	222	7.921	216	0.087	197	0.926	128	3.522	220	7.921	224	4.4
299	0.022	253	0.349	232	0.636	171	21.21	299	0.022	252	0.349	230	0.636	166	21.21	233	3.9
131	0.432	172	1.653	124	3.885	192	14.20	128	0.432	170	1.653	118	3.885	188	14.20	156	12.5
205	0.108	158	2.249	235	0.597	181	16.77	203	0.108	155	2.249	233	0.597	178	16.77	142	14.0
225	0.082	211	0.771	261	0.404	251	4.370	224	0.082	210	0.771	260	0.404	250	4.370	282	1.8
228	0.079	197	0.988	266	0.365	245	5.059	227	0.079	196	0.988	265	0.365	244	5.059	—	—
193	0.131	180	1.350	220	0.741	208	10.78	193	0.131	177	1.350	217	0.741	204	10.78	215	5.2
197	0.122	175	1.561	164	1.944	201	12.42	196	0.122	171	1.561	159	1.944	196	12.42	268	2.2
210	0.101	223	0.646	226	0.693	215	9.479	208	0.101	222	0.646	223	0.693	212	9.479	91	28.9
244	0.060	233	0.511	250	0.512	235	6.377	243	0.060	233	0.511	249	0.512	234	6.377	235	3.6
209	0.101	267	0.260	183	1.498	243	5.359	207	0.101	267	0.260	181	1.498	242	5.359	152	13.3
181	0.158	228	0.613	141	3.116	155	28.73	181	0.158	228	0.613	135	3.116	149	28.73	139	14.3
164	0.216	165	1.831	192	1.320	207	10.82	164	0.216	163	1.831	188	1.320	203	10.82	267	2.2
242	0.061	268	0.253	243	0.556	290	2.028	241	0.061	268	0.253	242	0.556	290	2.028	301	1.4
247	0.058	320	0.088	148	2.802	255	4.014	246	0.058	320	0.088	143	2.802	254	4.014	272	2.1
196	0.126	204	0.837	191	1.321	224	7.764	220	0.085	206	0.814	241	0.559	231	6.637	317	1.0
169	0.204	201	0.899	221	0.738	228	7.138	169	0.204	199	0.899	218	0.738	225	7.138	291	1.6
174	0.182	275	0.217	194	1.224	282	2.463	173	0.182	275	0.217	191	1.224	282	2.463	188	8.1
162	0.227	200	0.910	181	1.532	248	4.631	163	0.227	198	0.910	180	1.532	247	4.631	—	NA
234	0.071	222	0.653	227	0.679	205	11.08	233	0.071	223	0.638	225	0.675	211	9.532	356	0.2
249	0.056	225	0.621	230	0.647	193	14.03	248	0.056	225	0.621	228	0.647	189	14.03	178	10.0
161	0.230	333	0.059	117	4.908	300	1.646	162	0.230	333	0.059	111	4.908	300	1.646	189	7.8
221	0.086	288	0.172	155	2.273	234	6.458	217	0.086	288	0.172	148	2.273	233	6.458	191	7.7
236	0.023	235	0.499	327	0.116	273	2.849	296	0.023	235	0.499	327	0.116	273	2.849	116	20.0
236	0.066	266	0.273	265	0.368	299	1.647	235	0.066	266	0.273	264	0.368	299	1.647	256	2.5
198	0.118	163	1.970	212	0.863	182	16.67	280	0.031	192	1.037	303	0.170	222	7.643	281	1.8
93	0.962	106	7.006	101	7.506	131	50.63	83	0.962	98	7.006	90	7.506	125	50.63	—	—
259	0.039	214	0.763	241	0.568	204	11.16	268	0.039	213	0.763	239	0.568	200	11.16	245	3.1
226	0.081	203	0.847	229	0.657	183	16.64	225	0.081	201	0.847	227	0.657	179	16.64	323	0.9
245	0.059	205	0.836	249	0.524	202	12.19	244	0.059	202	0.836	248	0.524	197	12.19	146	13.9
256	0.040	210	0.780	201	1.074	154	29.72	265	0.040	209	0.780	198	1.074	147	29.72	127	17.5
309	0.019	179	1.393	180	1.559	196	13.95	309	0.019	175	1.393	179	1.559	191	13.95	303	1.3
211	0.098	234	0.509	185	1.447	178	17.15	209	0.098	234	0.509	183	1.447	175	17.15	355	0.2
268	0.039	218	0.736	167	1.805	185	15.54	267	0.039	217	0.736	162	1.805	181	15.54	92	28.2
237	0.065	224	0.631	195	1.187	189	15.02	236	0.065	224	0.631	192	1.187	185	15.02	182	9.2
336	0.011	272	0.230	335	0.099	321	1.099	336	0.011	272	0.230	335	0.099	321	1.099	318	0.9
230	0.031	226	0.618	246	0.531	213	9.642	279	0.031	226	0.618	245	0.531	209	9.642	234	3.6
241	0.063	195	1.018	276	0.329	223	7.807	240	0.063	194	1.018	275	0.329	221	7.807	147	13.9
330	0.076	270	0.246	177	1.614	161	26.81	229	0.076	270	0.246	176	1.614	154	26.81	—	NA
233	0.071	261	0.299	216	0.811	274	2.808	232	0.071	261	0.299	213	0.811	274	2.808	205	6.1
243	0.060	248	0.379	245	0.531	291	1.991	242	0.060	247	0.379	244	0.531	291	1.991	241	3.2
292	0.025	299	0.135	324	0.123	278	2.632	292	0.025	299	0.135	324	0.123	278	2.632	249	2.9

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256	General Hydrocarbons Inc.	15,494	288	2,911	248	(70)	233	5,801	242	2,780
257	Chaparral Resources Inc.[64]	15,374	352	801	265	(223)	207	8,684	308	1,088
258	Great Eastern Energy & Dev. Corp.	15,367	346	837	351	(3,159)	299	2,084	276	1,545
259	Excel Energy Corp.	14,673	258	4,577	338	(2,252)	213	7,972	210	4,810
260	Nugget Oil Corp.[52]	14,636	285	3,041	361	(5,136)	319	1,367	272	1,671
261	Pyramid Oil Co.	14,192	221	10,199	207	263	193	11,589	236	3,144
262	Seaxe Energy Corp.[82]	14,038	389	285	322	(1,213)	181	13,878	156	14,798
263	KRM Petroleum Corp.	13,928	272	3,924	272	(323)	198	10,384	251	2,228
264	Seahawk Oil International Inc.	13,854	278	3,464	208	257	219	7,593	232	3,269
265	Permian Basic Royalty Trust	13,841	134	57,331	52	56,776	206	[88]8,876	—	NA
266	Altex Oil Corp.[9]	13,748	250	5,241	333	(1,963)	190	12,121	271	1,684
267	Reichhold Energy Corp.[83]	12,886	255	4,820	146	1,822	225	6,872	237	3,112
268	Swift Energy Co.	12,639	300	2,267	188	583	250	4,624	273	1,653
269	Dietrich Resources Corp.[60]	12,238	252	4,993	293	(615)	224	6,950	205	5,355
270	Greenwood Resources Inc.	11,993	279	3,463	274	(369)	252	4,266	259	1,993
271	Vermillion Bay Land Co.[25]	11,967	246	5,863	158	1,335	205	9,586	240	2,923
272	Antares Oil Corp.	11,835	289	2,900	319	(1,129)	227	6,713	179	9,096
273	Geodyne Resources Inc.[84]	11,690	287	2,921	357	(4,070)	365	(2,211)	262	1,829
274	Golden Oil Co.[29]	11,472	251	5,069	203	334	239	5,348	201	5,965
275	Discovery Oil Ltd.	11,189	253	4,975	348	(2,898)	361	201	310	1,068
276	Striker Petroleum Corp.	11,172	259	4,557	150	1,720	210	8,325	228	3,627
277	Peninsula Resources Corp.	10,735	232	8,063	367	(6,925)	370	(12,211)	334	645
278	Noarko Resources Inc.[8]	10,667	284	3,167	360	(4,936)	242	5,025	307	1,088
279	Deca Energy Corp.[35]	10,353	355	737	290	(536)	203	9,754	275	1,584
280	GeoResources Inc.	10,301	254	4,962	184	652	231	5,895	315	979
281	Thor Energy Resources Inc.[20]	10,224	242	6,472	156	1,382	229	6,261	352	369
282	Burton/Hawks Inc.	10,192	290	2,885	354	(3,398)	216	7,847	254	2,163
283	Bluewater Oil & Gas Ltd.[92,93]	10,084	280	3,450	182	695	211	8,080	257	2,109
284	Pathfinder Petroleum Corp.[70]	9,891	314	1,746	180	730	265	3,513	388	64
285	Pangea Petroleum Co.	9,631	294	2,637	206	304	232	5,861	353	360
286	Newhall Resources	9,553	205	14,569	120	5,574	221	7,430	280	1,507
287	Fossil Oil & Gas Inc.[33]	9,238	313	1,807	369	(7,963)	347	694	247	2,451
288	Intercontinental Energy Corp.[9]	8,865	244	6,203	329	(1,838)	283	2,677	244	2,737
289	Oregon Natural Gas Dev. Corp.[90]	8,864	248	5,682	340	(2,310)	315	1,587	191	7,316
290	J M Resources Inc.[29]	8,603	296	2,494	315	(999)	320	1,353	370	138
291	Henry Energy Corp.[29]	8,580	241	6,574	218	140	240	5,266	250	2,257
292	Century Oil & Gas Corp.	8,505	292	2,796	307	(844)	307	1,730	234	3,206
293	Whiting Petroleum Corp.	8,240	312	1,818	202	339	218	7,709	325	754
294	So. Texas Drilling & Exploration Inc.	8,058	239	6,749	346	(2,696)	338	856	356	334
295	Gerber Energy International Inc.[87]	7,930	275	3,656	311	(919)	248	4,702	231	3,303
296	Jefferson-Williams Energy Corp.[94]	7,799	329	1,254	273	(364)	293	2,433	260	1,957
297	Nahama & Weagant Energy Co.[20]	7,785	282	3,273	285	(472)	258	3,787	269	1,779
298	Evergreen Resources Inc.[25]	7,700	358	644	299	(666)	220	7,498	264	1,778
299	Kae Exploration Inc.	7,644	326	1,310	286	(473)	245	4,844	286	1,486
300	Credo Petroleum Corp.[90]	7,467	342	882	209	203	226	6,787	344	401
301	Centennial Petroleum Inc.[35]	7,465	309	1,932	326	(1,660)	352	523	330	664
302	Eagle Exploration Co.[35]	7,331	295	2,606	358	(4,546)	358	311	339	542
303	Bayou Resources Inc.	7,326	286	2,978	200	342	276	3,009	248	2,393
304	Alta Energy Corp.[29]	7,185	303	2,215	217	145	278	2,919	309	1,097
305	Panhandle Royalty Co.[9]	6,949	267	4,177	168	1,119	251	4,348	328	702
306	Enex Resources Corp.	6,766	247	5,796	162	1,205	238	5,381	293	1,248

265	0.040	238	0.472	275	0.329	229	6.921	264	0.040	238	0.472	274	0.329	227	6.921	316	1.0
334	0.012	309	0.106	210	0.896	147	33.99	334	0.012	309	0.106	208	0.896	141	33.99	306	1.2
330	0.013	366	0.016	169	1.770	283	2.370	330	0.013	366	0.016	164	1.770	283	2.370	210	5.7
227	0.079	237	0.475	259	0.409	219	8.917	226	0.079	237	0.475	258	0.409	217	8.917	207	6.0
308	0.019	217	0.741	310	0.157	186	15.51	308	0.019	216	0.741	310	0.157	182	15.51	212	5.4
166	0.209	294	0.150	162	1.982	330	0.868	166	0.209	294	0.150	157	1.982	329	0.868	107	23.0
371	0.004	356	0.029	286	0.263	263	3.289	371	0.004	356	0.029	285	0.263	263	3.289	248	3.0
213	0.094	252	0.352	247	0.528	244	5.209	210	0.094	251	0.352	246	0.528	243	5.209	138	14.5
240	0.064	256	0.333	160	2.077	237	6.210	239	0.064	256	0.333	153	2.077	236	6.210	278	1.9
69	1.811	111	6.504	43	28.90	108	90.73	61	1.811	104	6.504	36	28.90	97	90.73	—	NA
254	0.053	276	0.216	256	0.431	336	0.783	253	0.053	276	0.216	255	0.431	336	0.783	226	4.4
390	0.001	219	0.726	384	0.011	247	4.708	390	0.001	218	0.726	384	0.011	246	4.708	135	15.0
382	0.002	331	0.063	344	0.078	295	1.822	382	0.002	331	0.063	344	0.078	295	1.822	134	15.0
203	0.111	230	0.578	218	0.771	257	3.847	200	0.111	230	0.578	215	0.771	256	3.847	350	0.3
255	0.052	241	0.411	231	0.642	238	6.172	254	0.052	241	0.411	229	0.642	237	6.172	194	7.3
200	0.116	229	0.584	209	0.928	246	4.790	198	0.116	229	0.584	207	0.928	245	4.790	304	1.2
246	0.058	247	0.379	279	0.323	266	3.145	245	0.058	246	0.379	278	0.323	266	3.145	172	10.5
267	0.039	260	0.317	311	0.153	294	1.914	266	0.039	260	0.317	311	0.153	294	1.914	239	3.3
199	0.117	251	0.352	153	2.401	254	4.105	197	0.117	250	0.352	146	2.401	253	4.105	70	39.4
219	0.088	243	0.404	211	0.889	272	2.886	215	0.088	243	0.404	209	0.889	272	2.886	193	7.4
186	0.146	313	0.101	113	5.415	361	0.366	186	0.146	313	0.101	105	5.415	361	0.366	149	13.9
321	0.015	332	0.060	350	0.071	333	0.810	321	0.015	332	0.060	350	0.071	333	0.810	297	1.5
235	0.066	269	0.246	264	0.382	285	2.274	234	0.066	269	0.246	263	0.382	285	2.274	280	1.9
328	0.014	350	0.036	302	0.172	324	1.020	328	0.014	350	0.036	301	0.172	324	1.020	238	3.4
218	0.089	306	0.118	217	0.806	327	0.918	214	0.089	306	0.118	214	0.806	327	0.918	225	4.4
313	0.017	255	0.337	339	0.092	280	2.534	313	0.017	254	0.337	339	0.092	280	2.534	337	0.5
232	0.072	274	0.218	200	1.078	258	3.831	231	0.072	274	0.218	197	1.078	257	3.831	246	3.0
212	0.096	246	0.386	166	1.834	210	10.65	222	0.084	255	0.336	165	1.748	216	9.244	208	6.0
294	0.024	358	0.026	244	0.532	310	1.334	294	0.024	358	0.026	243	0.532	310	1.334	196	6.9
264	0.041	232	0.564	254	0.447	221	8.186	263	0.041	232	0.564	253	0.447	219	8.186	326	0.8
167	0.208	157	2.262	171	1.698	173	19.21	167	0.208	154	2.262	167	1.698	168	19.21	166	10.8
31	0.018	254	0.341	321	0.130	270	2.900	310	0.018	253	0.341	321	0.130	270	2.900		—
28	0.028	316	0.092	305	0.167	338	0.743	287	0.028	316	0.092	305	0.167	338	0.743	321	0.9
--	—	220	0.688	—	—	279	2.546	—	—	220	0.688	—	—	279	2.546	206	6.0
24	0.057	315	0.094	236	0.580	329	0.876	247	0.057	315	0.094	234	0.580	329	0.876	332	0.6
22	0.082	338	0.052	269	0.361	357	0.434	223	0.082	338	0.052	268	0.361	357	0.434	155	12.6
23	0.064	319	0.089	233	0.619	304	1.471	238	0.064	319	0.089	231	0.619	304	1.471	250	2.9
27	0.031	303	0.125	309	0.160	317	1.184	278	0.031	303	0.125	309	0.160	317	1.184	—	NA
38	0.001	344	0.041	390	0.007	342	0.715	389	0.001	344	0.041	390	0.007	342	0.715	334	0.6
26	0.041	307	0.111	295	0.201	334	0.807	262	0.041	307	0.111	294	0.201	334	0.807	319	0.9
31	0.017	287	0.172	293	0.229	261	3.410	312	0.017	287	0.172	292	0.229	261	3.410	221	4.5
28	0.030	280	0.193	318	0.134	276	2.764	282	0.030	280	0.193	318	0.134	276	2.764	231	4.3
30	0.019	359	0.024	282	0.278	268	3.094	307	0.019	359	0.024	281	0.278	268	3.094	227	4.4
28	0.028	340	0.051	262	0.390	335	0.788	286	0.028	340	0.051	261	0.390	335	0.788	274	2.1
38	0.002	328	0.072	392	0.006	293	1.953	381	0.002	328	0.072	392	0.006	293	1.953	270	2.1
27	0.033	304	0.119	196	1.163	256	3.969	276	0.033	304	0.119	194	1.163	255	3.969	222	4.5
27	0.036	250	0.356	322	0.129	306	1.413	271	0.036	249	0.356	322	0.129	306	1.413	313	1.1
27	0.034	231	0.567	281	0.310	232	6.693	274	0.034	231	0.567	280	0.310	230	6.693	283	1.7
27	0.037	292	0.152	255	0.443	281	2.474	270	0.037	292	0.152	254	0.443	281	2.474	271	2.1
32	0.015	196	0.994	330	0.108	231	6.739	320	0.015	195	0.994	330	0.108	229	6.739	264	2.3
27	0.032	240	0.459	298	0.189	249	4.569	277	0.032	240	0.459	297	0.189	248	4.569	360	0.1

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Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
307	Columbine Exploration Corp.[84]	6,757	301	2,249	205	306	313	1,621	289	1,332
308	Cobb Resources Corp.[29]	6,679	268	4,110	164	1,136	284	2,666	278	1,517
309	Energy Assets International Corp.[35]	6,541	299	2,437	233	25	274	3,073	230	3,372
310	QED Exploration Inc.[77]	6,525	304	2,205	187	605	244	4,929	253	2,198
311	Mustang Drilling & Exploration Inc.	6,410	269	4,021	255	(131)	237	5,436	288	1,360
312	Prima Energy Corp.[29]	6,399	306	2,001	191	483	241	5,051	343	511
313	Marlin Oil Co.[52]	6,272	324	1,319	269	(294)	322	1,322	342	517
314	Henderson Petroleum Corp.	6,192	316	1,639	291	(537)	297	2,156	316	973
315	Great American Resources Inc.	5,762	317	1,604	234	18	243	4,957	376	142
316	Melton Drilling & Exploration Co.	5,548	274	3,662	276	(376)	259	3,771	359	319
317	Dallas Oil & Minerals Inc.	5,544	331	1,146	201	339	235	5,485	333	670
318	Parallel Petroleum Corp.	5,275	319	1,499	297	(652)	249	4,626	239	2,965
319	Usenco Inc.[50]	5,215	305	2,143	305	(838)	345	725	255	2,149
320	Circle Seven Oil & Gas Inc.[60]	4,903	336	1,040	257	(166)	279	2,843	290	1,331
321	Newport Petroleum Inc.[20]	4,736	333	1,081	281	(415)	257	3,970	296	1,212
322	Intramerican Oil & Minerals Inc.	4,692	311	1,839	220	110	280	2,758	320	839
323	Sparkman Producing Co.	4,671	310	1,843	323	(1,218)	263	3,559	298	1,198
324	Ridgeway EXCO Inc.[88]	4,660	351	802	232	25	271	3,306	313	1,016
325	Regal Petroleum Ltd.[14]	4,620	320	1,498	196	377	270	3,394	281	1,488
326	Petra Resources Inc.[20]	4,594	328	1,289	267	(227)	273	3,154	331	681
327	Falcon Oil & Gas Co. Inc.[20]	4,535	335	1,050	199	354	289	2,475	322	805
328	Midwest Exploration Inc.[8]	4,480	322	1,426	211	189	298	2,114	282	1,487
329	Lyric Energy Inc.[52]	4,427	372	500	262	(192)	304	1,928	371	184
330	Reef Energy Corp.	4,251	297	2,492	314	(944)	314	1,600	306	1,088
331	Aspen Exploration Corp.[20]	4,235	339	924	271	(319)	264	3,529	377	140
332	Tyrex Oil Co.[29]	4,224	365	554	302	(750)	253	4,190	279	1,509
333	NP Energy Corp.[35]	4,222	364	574	292	(559)	321	1,337	387	64
334	Love Oil Co. Inc.[60]	4,200	291	2,835	160	1,230	266	3,503	314	1,013
335	Transierra Exploration Corp.[50]	4,176	302	2,242	359	(4,713)	292	2,446	311	1,059
336	Roberts Oil & Gas Inc.[60]	4,130	360	629	280	(408)	262	3,610	327	749
337	Aztec Resources Corp.[35]	4,044	344	839	215	150	260	3,688	268	1,750
338	States Exploration Ltd.[35]	4,036	354	764	301	(701)	269	3,398	297	1,211
339	Search Natural Resources Inc.[84]	3,924	308	1,955	183	679	277	2,928	345	469
340	Blackgold Energy Resources Inc.[35]	3,813	378	416	244	(51)	311	1,658	381	111
341	Crescent Oil & Gas Corp.[8]	3,738	377	438	250	(80)	267	3,438	379	100
342	Wentex International Inc.	3,725	315	1,736	192	464	325	1,244	312	1,003
343	Masters Energy Corp.	3,458	343	874	163	1,201	294	2,304	346	434
344	Aracca Petroleum Corp.	3,452	345	838	321	(1,176)	275	3,055	336	655
345	Energy Capital Development Corp.	3,449	383	362	337	(2,232)	303	1,935	374	117
346	Hubco Exploration Inc.	3,366	325	1,317	237	11	323	1,293	292	1,210
347	Bengal Oil & Gas Corp.	3,354	370	511	332	(1,929)	324	1,291	283	1,400
348	Reserve Exploration Co.[35]	3,326	349	823	251	(88)	281	2,746	287	1,368
349	Double Eagle Pet. & Mining Co.[14]	3,291	321	1,445	239	6	295	2,191	317	955
350	Plano Petroleum Corp.[8]	3,253	353	799	229	41	272	3,160	355	388
351	Albion International Resources Inc.	3,248	348	828	247	(58)	308	1,720	261	1,902
352	Oil City Petroleum Inc.[14]	3,194	347	832	287	(494)	339	833	305	1,002
353	Southern Mineral Corp.	3,165	307	1,999	235	15	305	1,840	265	1,709
354	Tokian Oil Corp.[14]	3,141	323	1,324	252	(106)	286	2,528	349	433
355	Calvin Exploration Inc.[8]	3,077	376	439	317	(1,070)	290	2,456	319	804
356	Oxford Exploration Co.[29]	3,008	318	1,540	210	201	288	2,478	299	1,185
357	Universal Fuels Co.[60]	2,900	338	928	283	(463)	348	657	394	40

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
253	0.053	337	0.052	234	0.608	277	2.726	252	0.053	337	0.052	232	0.608	277	2.726	211	5.4
223	0.085	324	0.081	163	1.945	287	2.245	219	0.085	324	0.081	158	1.945	287	2.245	229	4.4
355	0.007	368	0.014	312	0.151	345	0.637	355	0.007	368	0.014	312	0.151	345	0.637	—	—
251	0.055	312	0.101	252	0.451	337	0.776	250	0.055	312	0.101	251	0.451	337	0.776	181	9.5
333	0.012	385	0.004	353	0.062	292	1.955	333	0.012	385	0.004	353	0.062	292	1.955	203	6.3
354	0.007	311	0.104	374	0.027	298	1.648	354	0.007	311	0.104	374	0.027	298	1.648	284	1.7
306	0.019	283	0.186	304	0.169	303	1.481	306	0.019	283	0.186	304	0.169	303	1.481	243	3.1
258	0.046	310	0.105	280	0.313	343	0.707	257	0.046	310	0.105	279	0.313	343	0.707	320	6.8
360	0.006	322	0.087	366	0.038	314	1.239	360	0.006	322	0.087	366	0.038	314	1.239	—	NA
367	0.005	382	0.005	362	0.043	371	0.176	366	0.005	382	0.005	362	0.043	371	0.176	292	1.6
319	0.015	296	0.146	349	0.071	322	1.087	319	0.015	296	0.146	349	0.071	321	1.087	254	2.7
327	0.014	279	0.201	287	0.262	288	2.199	327	0.014	279	0.201	286	0.262	288	2.199	260	2.4
326	0.014	308	0.108	202	1.060	262	3.343	326	0.014	308	0.108	199	1.060	262	3.343	199	6.8
375	0.003	284	0.184	381	0.017	332	0.837	375	0.003	284	0.184	381	0.017	332	0.837	230	4.3
332	0.012	281	0.192	352	0.066	305	1.425	332	0.012	281	0.192	352	0.066	305	1.425	277	2.0
303	0.020	265	0.277	289	0.241	265	3.208	303	0.020	265	0.277	288	0.241	265	3.208	290	1.6
281	0.030	264	0.279	297	0.190	301	1.603	281	0.030	264	0.279	296	0.190	301	1.603	289	1.6
300	0.021	379	0.008	319	0.133	367	0.271	300	0.021	379	0.008	319	0.133	367	0.271	180	9.8
291	0.025	295	0.149	288	0.248	289	2.104	291	0.025	295	0.149	287	0.248	289	2.104	213	5.4
353	0.007	347	0.037	325	0.121	354	0.477	353	0.007	347	0.037	325	0.121	354	0.477	331	0.7
380	0.002	258	0.321	368	0.036	198	13.65	380	0.002	258	0.321	368	0.036	193	13.65	341	0.5
274	0.035	293	0.150	273	0.340	328	0.909	273	0.035	293	0.150	272	0.340	328	0.909	311	1.1
345	0.009	336	0.054	314	0.142	218	9.292	345	0.009	336	0.054	314	0.142	215	9.292	262	2.4
273	0.035	257	0.323	331	0.106	323	1.081	272	0.035	257	0.323	331	0.106	323	1.081	287	1.7
298	0.022	346	0.037	290	0.240	340	0.724	298	0.022	346	0.037	289	0.240	340	0.724	351	0.3
366	0.005	392	(s)	363	0.042	395	0.005	365	0.005	392	(s)	363	0.042	395	0.005	358	0.2
388	0.001	289	0.169	388	0.010	286	2.249	388	0.001	289	0.169	388	0.010	286	2.249	—	—
342	0.010	345	0.040	371	0.029	388	0.036	342	0.010	345	0.040	371	0.029	388	0.036	322	0.9
262	0.041	271	0.235	338	0.096	381	0.091	261	0.041	271	0.235	338	0.096	381	0.091	214	5.3
341	0.010	321	0.087	340	0.091	339	0.734	341	0.010	321	0.087	340	0.091	339	0.734	310	1.1
317	0.016	330	0.063	301	0.173	348	0.600	317	0.016	330	0.063	300	0.173	348	0.600	174	10.0
285	0.029	375	0.011	285	0.266	375	0.126	285	0.029	375	0.011	284	0.266	375	0.126	266	2.2
284	0.029	—	—	272	0.341	—	—	284	0.029	—	—	271	0.341	—	—	344	0.4
359	0.006	370	0.012	274	0.329	271	2.891	359	0.006	370	0.012	273	0.329	271	2.891	345	0.4
352	0.007	318	0.089	316	0.135	264	3.237	352	0.007	318	0.089	316	0.135	264	3.237	293	1.5
340	0.010	236	0.480	317	0.134	240	5.966	340	0.010	236	0.480	317	0.134	239	5.966	247	3.0
302	0.020	342	0.046	326	0.120	369	0.260	302	0.020	342	0.046	326	0.120	369	0.260	269	2.2
311	0.017	—	—	320	0.132	—	—	311	0.017	—	—	320	0.132	—	—	242	3.1
374	0.003	351	0.035	375	0.023	362	0.364	374	0.003	351	0.035	375	0.023	362	0.364	—	—
290	0.025	290	0.165	283	0.274	296	1.761	290	0.025	290	0.165	282	0.274	296	1.761	338	0.5
396	(s)	297	0.145	367	0.037	252	4.260	396	(s)	297	0.145	367	0.037	251	4.260	359	0.1
293	0.024	353	0.032	278	0.323	368	0.266	293	0.024	353	0.032	277	0.323	368	0.266	237	3.4
261	0.045	341	0.050	270	0.358	319	1.142	260	0.045	341	0.050	269	0.358	319	1.142	329	0.7
318	0.015	360	0.022	334	0.100	349	0.588	318	0.015	360	0.022	334	0.100	349	0.588	296	1.5
325	0.014	355	0.031	260	0.405	311	1.321	325	0.014	355	0.031	259	0.405	311	1.321	333	0.6
289	0.027	384	0.004	242	0.565	386	0.039	289	0.027	384	0.004	240	0.565	386	0.039	—	—
316	0.016	349	0.036	337	0.097	309	1.337	316	0.016	349	0.036	337	0.097	309	1.337	244	3.1
339	0.010	273	0.222	364	0.040	318	1.175	339	0.010	273	0.222	364	0.040	318	1.175	300	1.4
387	0.001	314	0.099	393	0.005	347	0.608	387	0.001	314	0.099	393	0.005	347	0.608	279	1.9
257	0.051	363	0.018	294	0.218	377	0.120	256	0.051	363	0.018	293	0.218	377	0.120	—	NA
301	0.020	326	0.078	365	0.039	359	0.374	301	0.020	326	0.078	365	0.039	359	0.374	—	—

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Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
358	Western Natural Gas Co.	2,846	356	732	335	(2,001)	296	2,158	245	2,481
359	Crown Resource Corp.	2,825	367	548	221	92	282	2,696	301	1,152
360	Sunbelt Exploration Inc.[14]	2,779	340	923	238	8	318	1,550	360	259
361	Impact Energy Inc.	2,695	363	576	288	(502)	291	2,450	332	678
362	Cheyenne Resources Inc.	2,682	298	2,487	225	72	302	1,949	348	416
363	Tide West Oil Co.[84]	2,576	381	397	304	(836)	285	2,562	295	1,218
364	Grayhill Exploration Co.[80]	2,560	380	405	296	(644)	287	2,525	363	249
365	Wicklund Petroleum Corp.	2,553	337	1,031	320	(1,146)	317	1,559	323	802
366	Blue Jay Energy Corp.	2,491	332	1,097	270	(307)	310	1,685	335	642
367	Texoil Inc.	2,372	375	444	284	(472)	316	1,573	291	1,307
368	Amber Resources Company	2,371	327	1,295	336	(2,114)	312	1,656	338	553
369	Trans Atlantic Resource Corp.[29]	2,342	330	1,230	308	(908)	327	1,204	337	575
370	Ambra Oil & Gas Co.	2,335	341	897	228	44	326	1,243	350	401
371	Comanche Oil Exploration Inc.[35]	2,266	361	598	253	(109)	301	1,966	365	215
372	Loch Exploration Inc.	2,013	373	481	278	(394)	362	125	392	42
373	LR Co.[29]	1,932	371	506	298	(659)	363	(477)	329	697
374	Big Piney Oil & Gas Co.	1,834	366	552	224	74	306	1,734	382	99
375	International Royalty & Oil Co.[8]	1,782	374	464	230	32	309	1,693	369	203
376	Sharon Energy Ltd.[35,85]	1,767	385	351	258	(169)	355	466	378	137
377	PETX Petroleum Corp.[29]	1,628	359	632	219	110	336	921	347	423
378	TriValley Oil & Gas Corp.[77]	1,609	362	588	240	4	356	411	367	214
379	EMC Energies Inc.[29]	1,596	350	814	282	(462)	331	1,032	341	530
380	Shaw Resources Inc.[35]	1,489	382	394	222	91	333	993	358	320
381	Amacan Resources Corp.[52]	1,334	368	547	227	58	330	1,090	368	208
382	Wyoming Oil & Minerals Co.[84]	1,260	384	356	226	70	343	737	362	250
383	Natura Energy Corp.	1,248	334	1,068	195	393	337	904	326	752
384	Mountain States Resources Corp.[35]	1,151	395	133	313	(942)	350	576	395	9
385	Pioneer Oil & Gas Corp.[8]	1,139	357	667	242	(21)	332	1,017	383	98
386	Roseland Oil & Gas Inc.[20]	1,107	386	350	216	147	354	498	364	225
387	Score Exploration Corp.[29]	1,104	392	169	260	(181)	329	1,091	390	56
388	Arrowhead Energy Corp.[89]	1,012	396	96	261	(183)	335	922	386	82
389	Bolyard Oil & Gas Ltd.[52]	1,004	369	511	249	(71)	353	515	391	45
390	Golden Triangle Royalty & Oil Inc.	966	397	94	268	(289)	334	964	385	88
391	Bronco Oil & Gas Co.[8]	901	391	191	289	(531)	364	(1,404)	373	183
392	TPEX Exploration Inc.[29]	895	387	335	309	(912)	340	789	366	214
393	Energy Production Co.	891	388	325	264	(219)	341	776	372	183
394	Black Giant Oil Co.[35]	810	399	77	259	(174)	349	589	393	41
395	Imperial Energy Corp.[8]	778	390	270	243	(31)	344	734	351	397
396	Crown Energy Corp.	732	394	141	241	(10)	346	705	389	93
397	Houston Oil & Energy Inc.[29]	590	400	53	256	(157)	351	546	375	157
398	Croff Oil Co.	533	379	405	236	14	360	237	384	97
399	Trinity Oil & Gas Inc.[8]	441	393	162	275	(374)	357	371	381	110
400	Petroleum Land Corp.[50]	276	398	89	246	(56)	359	255	361	215
	Total	536,157,180		582,428,040		24,475,235		197,587,160		65,747,697

NA = Not available (s) = less than 500 bbl. or 500 Mcf. Fiscal yearend is Dec. 31 unless otherwise noted. 1. Formerly Standard Oil Co. (Indiana). 2. Subsidiary of U.S. Steel Corp. 3. Identifiable assets. 4. Operating income after foreign income taxes. 5. Subsidiary of E.I. duPont de Nemours Corp. 6. After-tax operating income. 7. Since fiscal yearend, has purchased Houston Natural Gas. 8. Fiscal yearend Sept. 30. 9. Since fiscal yearend, has been purchased by Coastal Corp. 10. Includes insignificant amounts of Canadian reserves. 11. Since fiscal yearend, has been purchased by InterNorth. 12. Five months ended Dec. 31. Changed fiscal yearend from July 31. 13. Production and reserves figures include most of reserves also listed under Transco Exploration Partners. 14. Fiscal yearend Aug. 31. 15. Since fiscal yearend, has purchased American Natural Resources. 16. Subsidiary of Union Pacific Corp. 17. Subsidiary of Allied Corp. 18. Mostly natural gas liquids production. 19. Includes crude oil reserves only. Does not include natural gas liquids. 20. Fiscal yearend Jan. 31. 21. Subsidiary of Burlington Northern Inc. 22. Formerly American Petrofina. 23. Subsidiary of W.R. Grace Co. 24. Production and reserves figures include most of the reserves also listed under Transco Energy. 25. Partners' capital. 26. Subsidiary of Santa Fe Southern Pacific. 27. Identifiable assets for Santa Fe Southern Pacific's Natural Resources Group which includes some coal mining operations. 28. Formerly Mountain Fuel Supply. 29. Fiscal yearend June 30. 30. Oil and gas producing subsidiary is Fuel Resources Inc. 31. Subsidiary of Allied Corp. and Ultramar PLC. Formerly Enstar Corp. 32. Six months ended Dec. 31. 33. Subsidiary of Goodyear Tire & Rubber Co. 34. Formerly Equitable Gas Co. 35. Fiscal yearend Mar. 31. 36. Subsidiary of CSX Corp. 37. Subsidiary of Monsanto Corp. 38. Formerly Yankee Oil & Gas Co. 39. Since fiscal yearend, has transferred all producing properties to Plains Petroleum Co. 40. Subsidiary of Broken Hill Proprietary Co. Ltd. Formerly Energy Reserves Group. 41. Sub-

324	0.014	323	0.081	356	0.057	351	0.526	324	0.014	323	0.081	356	0.057	351	0.526	—	NA
351	0.007	—	—	328	0.113	—	—	351	0.007	—	—	328	0.113	—	—	261	2.4
394	(s)	291	0.164	396	0.001	313	1.270	394	(s)	291	0.164	396	0.001	313	1.270	327	0.8
329	0.013	376	0.009	332	0.105	383	0.050	329	0.013	376	0.009	332	0.105	383	0.050	190	7.8
323	0.014	325	0.078	313	0.142	353	0.508	323	0.014	325	0.078	313	0.142	353	0.508	312	1.1
349	0.008	390	0.002	341	0.090	376	0.120	349	0.008	390	0.002	341	0.090	376	0.120	201	6.3
386	0.001	391	(s)	376	0.022	385	0.039	386	0.001	391	(s)	376	0.022	385	0.039	305	1.2
338	0.010	298	0.139	345	0.076	315	1.216	338	0.010	298	0.139	345	0.076	315	1.216	298	1.4
315	0.016	301	0.131	354	0.058	346	0.610	315	0.016	301	0.131	354	0.058	346	0.610	309	1.1
358	0.006	327	0.073	357	0.051	316	1.194	358	0.006	327	0.073	357	0.051	316	1.194	218	4.7
373	0.003	259	0.320	383	0.013	355	0.475	373	0.003	259	0.320	383	0.013	355	0.475	342	0.5
370	0.004	378	0.008	389	0.009	391	0.024	370	0.004	378	0.008	389	0.009	391	0.024	346	0.4
348	0.008	339	0.051	347	0.075	275	2.783	348	0.008	339	0.051	347	0.075	275	2.783	273	2.1
344	0.009	317	0.089	315	0.140	365	0.286	344	0.009	317	0.089	315	0.140	365	0.286	—	—
350	0.007	365	0.016	323	0.128	370	0.234	350	0.007	365	0.016	323	0.128	370	0.234	340	0.5
322	0.014	389	0.002	299	0.183	393	0.018	322	0.014	389	0.002	298	0.183	393	0.018	324	0.8
397	(s)	245	0.394	397	(s)	259	3.606	397	(s)	245	0.394	397	(s)	258	3.606	348	0.3
379	0.002	364	0.016	379	0.021	373	0.168	379	0.002	364	0.016	379	0.021	373	0.168	—	NA
378	0.002	335	0.054	391	0.006	312	1.288	378	0.002	335	0.054	391	0.006	312	1.288	—	NA
305	0.019	374	0.011	333	0.103	356	0.459	305	0.019	374	0.011	333	0.103	356	0.459	220	4.7
393	(s)	305	0.118	382	0.013	320	1.138	393	(s)	305	0.118	382	0.013	320	1.138	343	0.4
304	0.019	329	0.071	296	0.193	350	0.563	304	0.019	329	0.071	295	0.193	350	0.563	308	1.1
—	—	—	—	184	1.490	308	1.366	—	—	—	—	182	1.490	308	1.366	325	0.8
314	0.016	348	0.036	343	0.083	363	0.346	314	0.016	348	0.036	343	0.083	363	0.346	339	0.5
331	0.012	388	0.002	336	0.098	344	0.684	331	0.012	388	0.002	336	0.098	344	0.684	347	0.4
347	0.008	343	0.044	369	0.031	366	0.273	347	0.008	343	0.044	369	0.031	366	0.273	288	1.6
365	0.005	386	0.003	361	0.043	389	0.035	364	0.005	386	0.003	361	0.043	389	0.035	—	NA
372	0.003	—	—	378	0.021	382	0.081	372	0.003	—	—	378	0.021	382	0.081	314	1.0
364	0.005	354	0.031	360	0.046	364	0.310	363	0.005	354	0.031	360	0.046	364	0.310	—	NA
363	0.005	—	—	359	0.047	—	—	369	0.005	—	—	359	0.047	—	—	—	—
391	(s)	367	0.014	355	0.057	331	0.840	391	(s)	367	0.014	355	0.057	331	0.840	—	—
369	0.004	334	0.055	358	0.050	267	3.114	368	0.004	334	0.055	358	0.050	267	3.114	357	0.2
385	0.001	377	0.008	387	0.010	379	0.100	385	0.001	377	0.008	387	0.010	378	0.100	—	NA
362	0.005	373	0.011	386	0.010	384	0.041	362	0.005	373	0.011	386	0.010	384	0.041	—	—
357	0.006	352	0.033	370	0.030	374	0.159	357	0.006	352	0.033	370	0.030	374	0.159	275	2.0
346	0.008	372	0.011	342	0.083	372	0.168	346	0.008	372	0.011	342	0.083	372	0.168	349	0.3
384	0.001	381	0.005	394	0.003	390	0.026	384	0.001	381	0.005	394	0.003	390	0.026	—	NA
361	0.005	383	0.004	372	0.028	380	0.097	361	0.005	383	0.004	372	0.028	380	0.097	232	4.3
377	0.002	362	0.018	380	0.019	358	0.383	377	0.002	362	0.018	380	0.019	360	0.383	—	NA
392	(s)	371	0.011	395	0.002	387	0.037	392	(s)	371	0.011	395	0.002	387	0.037	—	NA
335	0.011	357	0.027	377	0.021	378	0.110	335	0.011	357	0.027	377	0.021	378	0.110	—	NA
368	0.004	380	0.005	385	0.010	394	0.016	367	0.004	380	0.005	385	0.010	394	0.016	335	0.6
383	0.001	369	0.013	291	0.239	284	2.292	383	0.001	369	0.013	290	0.239	284	2.292	—	—
	3,509.365		**12,863.565**		**35,704.721**		**186,301.852**		**2,239.378**		**10,267.370**		**22,665.308**		**134,252.478**		**18,569.1**

sidiary of Home Oil Corp. 42. Subsidiary of Fluor Corp. 43. Subsidiary of Houston Industries. 44. Subsidiary of Centex Corp. 45. Subsidiary of Kaiser Aluminum & Chemical Corp. 46. Subsidiary of Penn Central Corp. 47. Subsidiary of Southdown Inc. 48. Operating income before taxes and interest. 49. Subsidiary of DeKalb AgResearch Inc. Data also includes DeKalb's Canadian oil and gas operations. 50. Fiscal yearend Oct. 31. 51. Subsidiary of Placer Development Ltd. 52. Fiscal yearend Apr. 30. 53. Company is operating under Chapter 11. 54. Subsidiary of Consumers Power Co. 55. Subsidiary of CBI Industries Inc. 56. At Oct. 31. 57. Subsidiary of Homestake Mining. 58. Subsidiary of Moore McCormack Resources Inc. 59. U.S. operations only. 60. Fiscal yearend May 31. 61. Company is in the process of selling its oil and gas subsidiary. 62. Formerly Worldwide Energy Corp. 63. Four months ended Jun. 30. 64. Fiscal yearend Nov. 30. 65. Four months ended Dec. 31. 66. Trust Corpus. 67. Subsidiary of Gulf Resources & Chemical Corp. 68. Operating loss. 69. Subsidiary of International Minerals & Chemical Corp. 70. Subsidiary of AMAX Inc. 71. Subsidiary of National Distillers & Chemical Corp. 72. Estimate based on prior year figures. 73. Formerly McCormick Oil & Gas Co. 74. Oil and gas operations only. 75. Operating profit. 76. Formerly HCW Oil & Gas Co. 77. Fiscal yearend July 31. 78. Subsidiary of Public Service Co. of Colorado. 79. Production is natural gas liquids resulting from pipeline operations. 80. Company is chartered in Canada, but operates exclusively in the U.S. 81. Formerly Deep Gas Exploration Inc. 82. Formerly Royalty Ventures Corp. 83. Subsidiary of Reichhold Chemicals Inc. 84. Fiscal yearend Feb. 29. 85. Canadian company which operates mostly in the U.S. Financial figures converted to U.S. dollars. 86. Subsidiary of Northwest Natural Gas Co. 87. Formerly Keith Collins Petroleum Corp. 88. Nine months ended Dec. 31. Fiscal yearend changed from Mar. 31. 89. Since fiscal yearend, has been purchased by Reliance Enterprises.

Survey of operating refineries worldwide

(capacities of January 1, 1986)

Country	No. plants	b/cd Crude	Catalytic cracking	Catalytic reforming
Abu Dhabi	3	185,250	....	29,569
Algeria	4	464,700	....	55,600
Angola	1	32,100	....	1,900
Argentina	11	667,200	105,850	38,300
Australia	11	622,610	178,800	157,220
Austria	1	204,000	24,000	31,000
Bahrain	1	250,000	36,000	17,100
Bangladesh	1	31,200	....	1,650
Barbados	1	3,000	....	....
Belgium	4	652,100	100,500	78,200
Bolivia	3	46,930	....	14,158
Brazil	13	1,305,100	321,900	21,600
Brunei	1	10,000	....	....
Burma	2	26,300	....	....
Cameroon	1	43,000	....	6,500
Canada	28	1,855,800	377,000	352,700
Chile	2	141,000	34,000	5,300
China, Taiwan	2	542,500	22,600	51,960
Colombia	4	211,000	91,000	6,000
Congo	1	21,000	....	2,000
Costa Rica	1	15,200	....	1,300
Cyprus	1	16,000	....	3,400
Denmark	3	166,000	....	29,100
Dominican Republic	2	44,000	....	8,300
Ecuador	3	87,600	12,600	2,780
Egypt	6	434,150	....	30,870
El Salvador	1	16,300	....	2,800
Ethiopia	1	18,000	....	2,200
Finland	2	241,000	41,800	55,100
France	16	1,946,850	258,300	271,100
Gabon	1	23,000	....	1,400
Germany	22	1,932,800	183,200	355,500
Ghana	1	28,000	....	5,550
Greece	4	390,000	23,000	31,200
Guatemala	1	16,000	....	3,000
Honduras	1	14,000	....	1,800
Hungary	3	241,500	20,000	26,000
India	12	866,682	104,070	28,490
Indonesia	6	635,800	....	60,700
Iran	4	530,000	....	63,845
Iraq	8	318,500	....	43,500
Ireland	1	56,000	....	11,000
Israel	2	170,000	18,000	24,500
Italy	21	2,738,100	273,500	311,800
Ivory Coast	2	90,000	....	14,600
Jamaica	1	35,500	....	3,540
Japan	44	4,613,400	472,750	543,950
Jordan	1	100,000	4,410	8,640
Kenya	1	95,000	....	9,000
Korea	6	782,000	....	59,454
Kuwait	5	633,600	....	51,000
Lebanon	2	17,000	....	3,100
Liberia	1	15,000	....	2,000
Libya	3	329,800	....	14,182
Madagascar	1	16,350	....	2,600
Malaysia	4	212,300	....	20,900
Martinique	1	12,800	....	3,000
Mexico	9	1,269,000	297,000	163,800
Morocco	2	81,303	5,600	13,735
Mozambique	1	17,000	....	2,500
Netherlands	7	1,468,350	122,500	148,400
Netherlands Antilles	1	320,000	42,000	15,000
New Zealand	1	53,000	....	18,000
Nicaragua	1	14,500	....	2,800
Nigeria	3	250,400	44,100	38,100
Norway	3	240,000	....	29,150
Okinawa	3	110,000	....	7,400
Oman	1	48,082	....	9,644
Pakistan	3	130,000	....	5,750
Panama	1	100,000	....	7,500
Paraguay	1	7,500	....	....
Peru	6	175,560	21,670	1,680
Philippines	3	216,000	23,100	33,400
Portugal	3	295,607	10,141	35,909
Puerto Rico	2	121,000	12,000	5,800
Qatar	1	56,058	....	10,463
Saudi Arabia	5	1,115,000	10,000	87,900
Senegal	1	29,800	....	2,870
Sierra Leone	1	10,000	....	....
Singapore	5	1,018,000	....	49,600
Somalia	1	10,000	....	....
South Africa	5	388,500	80,000	62,500
Spain	10	1,367,000	87,500	193,100
Sri Lanka	1	50,000	....	3,750
Sudan	1	23,800	....	1,700
Sweden	6	429,000	26,666	74,588
Switzerland	2	137,000	....	25,000
Syria	2	228,790	....	19,348
Tanzania	1	13,500	....	3,000
Thailand	3	191,860	9,250	25,300
Togo	1	20,000	....	4,400
Trinidad	2	260,000	25,000	29,000
Tunisia	1	34,000	....	3,300
Turkey	4	460,475	38,600	45,057
United Kingdom	15	1,791,700	363,500	368,500
Uruguay	1	45,000	5,000	3,000
Venezuela	7	1,229,700	179,400	6,000
Virgin Islands	1	600,000	....	125,000
Yemen, S.	1	161,500	....	10,800
Yugoslavia	7	301,607	1,960	45,156
Zaire	1	17,000	....	3,000
Zambia	1	25,000	....	5,600
Total	**428**	**40,144,614**	**4,108,267**	**4,734,458**

Country-by-country refining survey

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
ABU DHABI			
Abu Dhabi National Oil Co.–Ruwais	114,000	....	[2]17,235
Umm Al-Nar 1	14,250	....	[4]2,520
Umm Al-Nar 2	57,000	....	[3]9,814
Total	**185,250**	**....**	**29,569**
ALBANIA			
Government-owned refineries at Ballsh, Cerrik, Stalin			
Total	**40,000**		
ALGERIA			
Sonatrach: Arzew	60,000	....	8,600
Hassi Messaoud	23,700	....	2,000
Maison Carree	58,000	....	15,000
Skikda	323,000	....	30,000
Total	**464,700**	**....**	**55,600**
ANGOLA			
Petrangol SARL–Luanda	**32,100**	**....**	[1]**1,900**
ARGENTINA			
Destileria Argentina de Petróleo SA–			
Lomas de Zamora	2,000	....	....
Esso SAPA–Campana	94,400	[1]24,850	[1]8,300
Galvan	17,800	....	....
Isaura SA–Bahia Blanca	12,000	....	....
Shell Cia. Argentina de Petróleo SA–			
Buenos Aires	102,000	20,000	9,500
Yacimientos Petroliferos Fiscales–			
Campo Duran	32,000	....	....
Dock Sud	4,000	....	....
La Plata	216,000	[1]45,000	[1]9,000
Lujan de Cuyo	129,000	[1]16,000	[1]5,000
Plaza Huincul	23,000	....	[2]2,500
San Lorenzo	35,000	....	....
Total	**667,200**	**105,850**	**38,300**
AUSTRALIA			
Ampol Refineries Ltd.–Lytton[1]	65,000	[1]26,000	[1]12,600
Australian Oil Refinery PL–Kurnell[2]	100,000	[1]39,000	[1]25,600
Australian Lubricating Oil Refinery			
Ltd.–Kurnell	....	....	....
BP Australia–Brisbane	42,000	[1]12,800	[2]8,500
Kwinana	100,000	[1]24,000	[1]6,400
			[2]16,400
Maranoa Oil & Refining Co.–			
Roma, Queensland	510	....	[1]220
Mobil Oil Australia Ltd.–Adelaide	....	....	....
Petroleum Refineries Australia PL–			
Adelaide	46,500	....	[2]16,000
Altona	98,600	[2]24,000	[2]28,000
Shell Refining (Australia) PL.–Clyde	64,000	28,000	12,500
Geelong	106,000	[1]25,000	31,000
Total	**622,610**	**178,800**	**157,220**

Solvent extraction: [1]5,300 b/cd. [2]4,800 b/cd.

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
AUSTRIA			
OeMV–Schwechat	204,000	[1]24,000	[2]14,000
			[4]17,000
Total	**204,000**	**24,000**	**31,000**
BAHRAIN			
Bahrain Petroleum Co. BSC (Closed)			
–Sitra	250,000	[1]36,000	[4]17,100
Total	**250,000**	**36,000**	**17,100**
BANGLADESH			
Eastern Refinery Ltd.–Chittagong	**31,200**	**....**	[1]**1,650**
BARBADOS			
Mobil Oil Barbados Ltd.–Bridgetown	**3,000**	**....**	**....**
BELGIUM			
Belgian Refining Corp. NV–Antwerp	108,500	....	[2]12,000
Belgian Shell NV–Ghent	8,600	....	....
Esso Belgium–Antwerp	229,000	[1]25,000	[4]36,000
SIBP NV–Antwerp	306,000	[1]75,500	[2]30,200
Total	**652,100**	**100,500**	**78,200**
BOLIVIA			
Yacimientos Petroliferos			
Fiscales Bolivianos–Cochabamba[1]	27,500	....	[1]7,758
Santa Cruz	16,430	....	[1]6,400
Sucre	3,000	....	....
Total	**46,930**	**....**	**14,158**

[1]Solvent extraction: 166 b/cd.

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
BRAZIL			
Petróleo Brasileiro SA: Araucária,			
Paraná[1]	144,800	[1]45,500	....
Betim, Minas Gerais	120,600	[1]30,400	....
Canoas, Rio Grande do Sul	63,300	[1]13,600	....
Cubatão, São Paulo	127,300	[1]48,300	[1]10,200
		[5]3,700	
Duque de Caxias, Rio de Janeiro[2]	221,300	[1]46,300	[1]11,400
	....		
Fortaleza, Ceará	4,200	....	....
Manaus, Amazonas	8,400	[1]1,800	....
Mataripe, Bahia[3]	122,400	[1]25,000	....
Mauá, Santo André, São Paulo	27,200	[2]14,400	....
Paulínia, São Paulo	289,500	[1]39,800	....
São José dos Campos, São Paulo	156,800	[1]54,300	....
	....		
Refinaria de Petróleo Ipiranga SA–Rio			
Grande do Sul	9,300	[1]2,500	....
Refinaria de Petroleos de Manguinhos			
SA–Rio de Janeiro	10,000	....	....
Total	**1,365,100**	**321,900**	**21,600**

Solvent extraction: [1]28,400 b/d. [2]30,200 b/d (13,100 b/d for lubes). [3]3,400 (for lubes).

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
BRUNEI			
Brunei Shell Petroleum CL–Seria	10,000	....	....
BULGARIA			
Government-owned refineries at Burgas, Pleven, Ruse.			
Total	300,000		
BURMA			
Petrochemical Industries Corp.–Chauk	6,300	....	....
Syriam	20,000	....	....
Total	26,300	....	....
CAMEROON			
Sonara–National Refining CL–Cape Limboh, Limbe	43,000	....	[2]6,500
CANADA			
Alberta			
Gulf Canada Products Co.–Edmonton	121,000	....	[2]12,600
Husky Oil Operations Ltd.–Lloydminster	23,500	....	....
Imperial Oil Ltd.–Edmonton	163,700	[1]47,000	[4]20,900
Shell Canada Ltd.–Bowden	5,000	....	[6]2,250
Scotford	50,000	....	[5]18,450
Turbo Resources Ltd.–Balzac	27,500	[1]8,800	[2]7,550
Total	390,700	55,800	61,750
British Columbia			
Chevron Canada Ltd.–North Burnaby	35,000	[1]13,000	[2]11,700
Gulf Canada Products Co.–Port Moody	37,200	[1]12,300	[2]8,600
Husky Oil Operations Ltd.–Prince George	9,500	[1]3,300	[4]1,400
Imperial Oil Ltd.–Ioco	40,900	[1]12,400	[1]6,700
Petro-Canada Products Inc.–Taylor	19,000	[1]6,250	[2]2,950
Shell Canada Ltd.–Shellburn, Burnaby[1]	24,000	[1]5,400	[6]2,430
Total	165,600	52,650	33,780
[1]Solvent extraction: 720 b/cd.			
New Brunswick			
Irving Oil Ltd.–St. John	237,500	[1]17,100	[3]34,650
Total	237,500	17,100	34,650
Northwest Territories			
Imperial Oil Ltd.–Norman Wells	2,900	....	....
Nova Scotia			
Imperial Oil Ltd.–Dartmouth	82,300	[1]22,600	[4]8,500
Texaco Canada Ltd.–Halifax	20,000	[1]7,200	[3]3,600
Total	102,300	29,800	12,100
Ontario			
Gulf Canada Products Co.–Clarkson[1]	60,000	....	[6]8,800
Imperial Oil Ltd.–Sarnia	123,500	[1]23,000	[2]15,500 [4]13,300
Petro-Canada Products Inc.–Oakville	80,000	[2]23,000	[1]5,000 [3]11,500
Shell Canada Ltd.–Sarnia	71,000	[1]14,400	[6]20,970
Sunoco Inc.–Sarnia	90,000	[2]17,000	[1]5,500 [3]22,500
Texaco Canada Ltd.–Nanticoke	95,000	[1]40,000	[3]24,000
Total	519,500	117,400	127,070
Quebec			
Gulf Canada Products Co.–Montreal[1]	74,000	[1]22,100	[3]8,600
Petro-Canada Products Inc.–Montreal	90,000	[2]18,000	[3]30,500
Shell Canada Ltd.–Montreal	120,000	[1]21,150	[6]20,700
Ultramar Canada Inc.–St. Romuald	100,000	[1]30,000	[2]14,600
Total	384,000	91,250	74,400
[1]Solvent extraction: 4,400 b/cd.			

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
Saskatchewan			
Consumer's Cooperative Refineries Ltd.–Regina	40,000	[1]13,000	[1]9,000
Gulf Canada Products Co.–Moose Jaw	13,300	....	....
Total	53,300	13,000	9,000
Total Canada	1,855,000	377,000	352,700
CHILE			
Petrox SA–Concepción	72,000	[1]20,000	....
Refinería de Concón–Concón	69,000	[1]14,000	[1]5,300
Total	141,000	34,000	5,300
CHINA			
Government-owned refineries at Anshan, Beijing, Dalian, Daqing, Fushun, Hangzhou, Jinxi, Karamai-Dushanzi, Lanchow, Lenghu, Maoming, Nanchong, Nanjing, Shanghai, Shengli, Tianjin, Yumen.			
Total	2,150,000		
CHINA, TAIWAN			
Chinese Petroleum Corp.–Kaohsiung	425,000	[1]22,600	[2]18,080
Tao-Yuan	117,500	....	[2]15,800
Total	542,500	22,600	51,960
COLOMBIA			
Empresa Colombiana de Petróleos –Barrancabermeja-Santander[1]	135,000	[1]62,000	[2]6,000
Cartagena, Bolivar	70,000	[1]29,000	....
Orito, Putumayo	1,000	....	....
Tibu, N. de Santander	5,000	....	....
Total	211,000	91,000	6,000
[1]Solvent extraction: 35,000 b/cd.			
CONGO			
Coraf–Pointe-Noire	21,000	....	[2]2,000
COSTA RICA			
Refinadora Costarricense de Petroleo SA–Limón	15,200	....	[2]1,300
Total	15,200	....	1,300
CUBA			
Government-owned refineries at Cabaiguan, Havana, Santiago de Cuba.			
Total	180,000		
CYPRUS			
Cyprus Petroleum Refinery Ltd.–Larnaca	18,000	....	[4]3,400
CZECHOSLOVAKIA			
Government owned refineries at Bratislava, Kolin, Kralupi, Pardubice, Strazka, Zaluzi, Zyolen.			
Total	455,000		
DENMARK			
AS Dansk Shell–Fredericia	49,000	....	11,000
Dansk Esso AS–Kalundborg	65,000	....	[2]7,800
Kuwait Petroleum Refining (Danmark) A/S–Skaelskor	52,000	....	[3]10,300
Total	166,000	....	29,100
DOMINICAN REPUBLIC			
Falconbridge Dominicana C por A–La Peguera	16,000	....	....
Refinería Dominicana de Petróleo SA–Haina	28,000	....	8,300
Total	44,000	....	8,300

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	Cat reforming
ECUADOR			
CEPE–Esmeraldas	55,600	[1]12,600	–[2]2,780
Anglo Ecuadorian Oilfields Ltd.–Sta. Elena Peninsula	31,000	....	....
Texaco–Lago-Agrio	1,000	....	....
Total	**87,600**	**12,600**	**2,780**
EGYPT			
Alexandria Petroleum Co.–Alexandria (El-Mex)	111,150	....	....
Cairo Oil Refining Co.–Mostorod	128,250	....	[2]9,000
Tanta	24,700	....	....
El Ameria Oil Refining Co.–Alexandria	71,250	....	[2]9,000
El-Nasr Petroleum Co.—El-Suez	76,000	....	....
Suez Oil Processing Co.–El-Suez	22,800	....	[2]12,870
Total	**434,150**	**....**	**30,870**
El SALVADOR			
Refinería Petrólera Acajutla SA–Acajutla	16,300	....	[1]2,800
Total	**16,300**	**....**	**2,800**
ETHIOPIA			
Ethiopian Petroleum Corp.–Assab	**18,000**	**....**	[2]2,200
FINLAND			
Neste Oy–Naantali	44,000	[2]13,300	[5]6,800
Porvoo	197,000	[1]28,500	[1]19,600
Total	**241,000**	**41,800**	**55,100**
FRANCE			
Cie. Francaise de Raffinage–Gonfreville L'Orcher[3]	309,000	[1]30,100	[2]45,400
La Mède	136,000	[1]30,000	[2]23,400
Mardyck	122,000	[1]21,000	[2]20,500
Cie. Rhénane de Raffinage–Reichstett-Vendenheim	86,000	[1]11,000	12,000
Elf France–Ambes	....	[1]7,000	....
Donges	214,000	[1]34,000	[4]30,000
Feyzin	186,000	[1]18,000	[4]9,800
Grandpuits	100,000	[1]25,000	[4]15,000
Esso SAF–Fos sur Mer	68,000	....	[2]10,000
Port Jerome	57,950	[1]7,200	[2]6,300
Mobil Oil Francaise–Frontignon	82,000	[2]17,000	[2]20,000
Notre Dame de Gravenchon	57,000	....	[2]17,000
Shell Francaise–Berre l'Etang	130,000	19,000	15,000
Petit Couronne	217,000	[1]19,000	41,000
Ste. Francaise des Petroles BP–Dunkirk	....	....	....
Lavera	181,900	[1]20,000	[1]5,700
Total	**1,946,850**	**258,300**	**271,100**

[1]Solvent extraction: 9,800 b/cd.

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	Cat reforming
GABON			
Ste. Gabonaise de Raffinage–Port Gentil	**23,000**	**....**	[2]1,400
GERMANY, E.			
Government-owned	**479,000**		
GERMANY, WEST			
Deutsche BP-Erdol Ingolstadt–Vohburgt	102,000	[1]17,200	[2]16,700
Deutsche Marathon Pe...ium GmbH–Burghausen	70,000	....	....
Deutsche Shell AG–Godorf	170,000	....	38,000
Harburg-Grasbrook	86,000	[1]12,000	15,000
Monheim	8,000	....	....
Deutsche Texaco AG–Heide	80,000	[5]9,000	[4]18,000
Elf Bitumenwerke GmbH–Brunsbuettel	....	....	....
Erdol Raffinerie Duisburg GmbH–Duisburg	37,800	....	[2]7,300
Erdoel Raffinerie Neustadt GmbH–Neustadt-Donau	144,000	[1]22,700	[1]17,700
Esso AG–Hamburg	90,000	[1]15,500	[2]12,800
Ingolstadt	95,000	[1]19,800	[2]12,800
Karlsruhe	150,000	....	[2]27,900
Gewerkschaft Erdol-Raffinerie Deurag-Nerag–Misburg	45,000	....	7,000
Mobil Oil AG–Wilhelmshaven	160,000	....	[2]32,000
Worth	75,000	[1]15,000	[2]14,000
Oberrheinische Mineraloiwerke GmbH–Karlsruhe	142,000	[1]66,000	[2]11,400 [6]20,100
Oelwerke Julius Schindler GmbH–Hamburg	....	....	....
Ruhr Oel GmbH–Gelsenkirchen	215,400	[1]8,000	[1]11,900 [5]27,000
Union Rheinische Braunkohlen Kraftstoff AG–Wesseling	95,000	....	[4]14,000
Wintershall AG–Lingen	91,400	....	[1]7,400 [2]11,100 [4]15,000
Mannheim	71,100	....	[2]18,400
Salzbergen	5,100	....	....
Total	**1,932,800**	**183,298**	**355,580**

†Operating on a semi-integrated basis.

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	Cat reforming
GHANA			
Ghanaian Italian Petroleum CL–Tema	**28,000**	**....**	[1]5,550
GREECE			
Hellenic Aspropyrgos Refinery SA–Aspropyrgos	110,000	....	[2]5,200 [2]9,500
Motor Oil (Hellas) Corinth Refineries SA–Aghii Theodori	100,000	[1]23,000	[1]8,500
Petrola Hellas SA–Elefsis	108,000	....	....
Thessaloniki Refining Co. AE–Thessaloniki	72,000	....	[2]8,000
Total	**390,000**	**23,000**	**31,200**
GUATEMALA			
Texas Petroleum Co.–Escuintla	16,000	....	[2]3,000
Total	**16,000**	**....**	**3,000**
HONDURAS			
Refinería Texas de Honduras SA–Puerto Cortes	14,000	....	[1]1,800
Total	**14,000**	**....**	**1,800**
HUNGARY			
Dunai KV–Százhalombatta	165,000	20,000	[4]26,000
Tiszai KV–Leninváros	66,500	....	....
Zalai KV–Zalaegerszeg	10,000	....	....
Total	**241,500**	**20,000**	**26,000**
INDIA			
Bharat Petroleum CL–Mahul, Bombay	105,432	[1]17,000	7,000
Bongaigaon Refinery & Petrochemicals Ltd.–Bongaigaon, Assam	21,400	....	[1]1,930
Cochin Refineries Ltd.–Kerala	90,000	[1]19,100	[5]5,660
Hindustan Petroleum CL–Mahul, Bombay	90,000	[1]9,000	....
Visakhapatnam	30,000	[1]7,600	....
Indian Oil CL–Barauni	66,000	....	....
Digboi	10,050	....	....
Gauhati	18,400	....	....
Gujarat	147,700	[1]19,800	[2]7,000
Haldia	55,000	....	[1]4,500
Mathura	120,000	[1]19,800	....
Madras Refineries Ltd.–Madras	114,700	[1]11,770	[1]2,400
Total	**868,682**	**194,070**	**29,490**

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
INDONESIA			
Lemigas–Cepu, Central Java	1,000	....	....
Pertamina–Balikpapan, Kalimantan	230,500	...	[6]18,000
Cilacap, Central Java	270,000	...	[3]29,100
Dumai, Central Sumatra	90,000	....	[2]13,600
Pangakalan Brandan, North Sumatra	3,600	....	....
Sungai Pakning, Central Sumatra	40,700	....	....
Total	**635,800**	**....**	**60,700**
IRAN			
National Iranian Oil Co.–Esfahan	200,000	....	29,600
Shiraz	40,000	....	6,245
Tabriz	80,000	....	....
Tehran	210,000	....	28,000
Total	**930,000**	**....**	**63,845**
Note: Present status uncertain due to Iran-Iraq war.			
IRAQ			
Oil Refineries Administration–Baiji	150,000	....	22,000
			16,500
Basra	70,000	....	....
Daura	71,000	....	5,000
K3-Haditha	7,000	....	....
Khanaqin	12,000	....	....
Mufthia	4,500	....	....
Qaiyarah, Mosul	2,000	....	....
Iraqi Company for Oil Operations–Kirkuk	2,000	....	....
Total	**318,500**	**....**	**43,500**
Note: Present status uncertain due to Iran-Iraq war.			
IRELAND			
Irish Refining CL–Whitegate	**56,000**	....	[2]**11,000**
ISRAEL			
Oil Refineries Ltd.–Ashdod	70,000	....	[2]10,000
Haifa	100,000	[1]18,000	[2]14,500
Total	**170,000**	**18,000**	**24,500**
ITALY			
ANIC SpA–Gela	80,000	[1]27,000	[2]10,000
Anonima Petroli Italiana–Falconara, Marittima	83,000	....	[2]11,000
ERG SpA–Genoa, San Quirico	130,900	....	[2]10,500
Esso Italiana SpA–Augusta, Siracusa	180,000	[1]39,300	[1]7,600
			[3]6,600
Industrie Chimiche Italiane de Petrolio SpA–Frassino, Mantovano	55,000	....	9,500
Industria Italiana Petroli–Rho	79,800	[2]13,700	[2]16,000
Taranto	90,900	....	[2]16,000
Iplom SpA–Busalla	46,500	....	....
Irom–Industria Raffinazione Oli Minerali–Porto Marghera	108,000	....	[2]16,000
Isab–Melilli	220,000	....	[4]34,500
Lombarda Petroli SpA–Villasanta	23,500	....	[5]4,000
Mediterranea SpA–Milazzo	145,000	[4]0 000	[3]10,000
Mobil Oil Italiana SpA–Naples	100,000	[2]18,400	[2]12,500
Raffineria del Po SpA–Sannazaro de Burgondi	230,000	[1]27,000	[2]10,500
Raffineria di Roma SpA–Rome	91,200	....	[2]15,100
Saras SpA–Sarroth	324,000	[1]63,000	[4]13,000
			[5]27,000
Sarpom–Trecate, Novara	215,000	[1]15,100	[2]19,000
			[4]8,000
Selm-Soc. Energia Montedison–Priolo	300,000	[1]30,000	[2]9,000
Soc. Petrolifera Italiana–Arcola, La Spezia	25,000	....	....
Stanic–Livorno	111,200	....	[2]19,500
Tamoil Italia SpA–Cremona	100,000	....	[1]3,800
			[2]6,400
Total	**2,738,100**	**273,500**	**311,800**

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
IVORY COAST			
Ste. Ivoirienne de Raffinage–Abidjan	80,000	....	[2]14,600
Ste. Multinationale de Bitumes–Abidjan	10,000	....	....
Total	**90,000**	**....**	**14,600**
JAMAICA			
Petrojam Ltd.–Kingston	35,500	....	[1]3,540
Total	**35,500**	**....**	**3,540**
JAPAN			
Asia Kyoseki CL–Sakaide, Kagawa	135,000	[1]13,500	[2]9,000
Asia Oil CL–Hakodate	22,500	....	[2]1,170
Yokohama, Kanagawa	90,000	....	[2]12,600
Cosmo Oil CL–Chiba	209,000	[1]23,400	[2]22,500
Sakai	104,500	[1]17,550	[2]6,300
Yokkaichi City	166,250	[1]18,000	[2]5,400
			[4]7,200
Fuji Kosan Oil CL–Kainan	77,600	....	....
Fuji Oil CL–Sodegaura	153,700	[1]12,500	[2]13,600
General Sekiyu Seisei KK–Sakai	108,000	[1]27,000	[2]22,500
Idemitsu Kosan CL–Chita, Aichi	123,500	....	[2]16,200
Himeji, Hyogo	10,450	....	[2]13,500
Ichihara, Chiba[1]	199,500	[1]37,800	[2]15,300
Tokuyama, Yamaguchi	95,000	[1]20,700	[2]10,800
Tomakomai, Hokkaido	85,500	....	[2]16,200
Kashima Oil CL–Kashima, Ibaragi	150,000	[1]14,000	[4]12,500
Koa Oil CL–Marifu	125,100	[1]14,400	[2]8,730
Osaka	72,000	[1]16,200	[2]8,100
Kyokuto Petroleum Ltd.–Chiba	143,000	....	[2]14,500
Kyushu Oil CL–Oita	130,000	[1]16,500	[2]8,000
Maruzen Oil CL–Matsuyama	....	....	[1]4,050
Shimotsu	....	....	....
Mitsubishi Oil CL–Kawasaki	75,000	....	[2]15,000
Mizushima	220,000	[1]30,000	[2]30,100
Nichimo Sekiyu Seisei KK–Kawasaki	76,000	....	[1]7,600
Nihonkai Oil CL–Toyama	60,000	....	....
Nippon Mining CL–Chita	85,000	[1]10,000	[2]22,000
Funakawa	6,000	....	....
Mizushima	190,200	[1]35 000	[2]20,000
Nippon Oil CL–Niigata	28,000	....	[2]5,100
Nippon Petroleum Refining CL–Kudamatsu	22,000	....	[2]1,300
Muroran	150,000	[1]19,000	[2]19,000
Negishi	305,000	[1]36,000	[2]33,000
Yokohama	55,000	.....	[2]1,800
Seibu Sekiyu KK–Onoda	134,000	....	17,000
Showa Shell Sekiyu KK–Kawasaki	135,000	....	20,000
Niigata	30,000	....	4,400
Showa Yokkaichi Sekiyu KK–Yokkaichi	207,000	15,000	38,000
Taiyo Oil CL–Ehime	65,000	....	[2]5,000
Toa Nenryo Kogyo–Kawasaki	190,000	[1]68,400	[2]15,200
Shimizu	28,500	....	[2]4,400
Wakayama	162,500	[1]27,800	[2]34,200
Toa Oil CL–Kawasaki	65,000	....	[2]11,000
Toho Oil CL–Owase	40,000	....	....
Tohoku Oil CL–Sendai	83,600	....	[2]11,700
Total	**4,613,400**	**472,750**	**543,950**

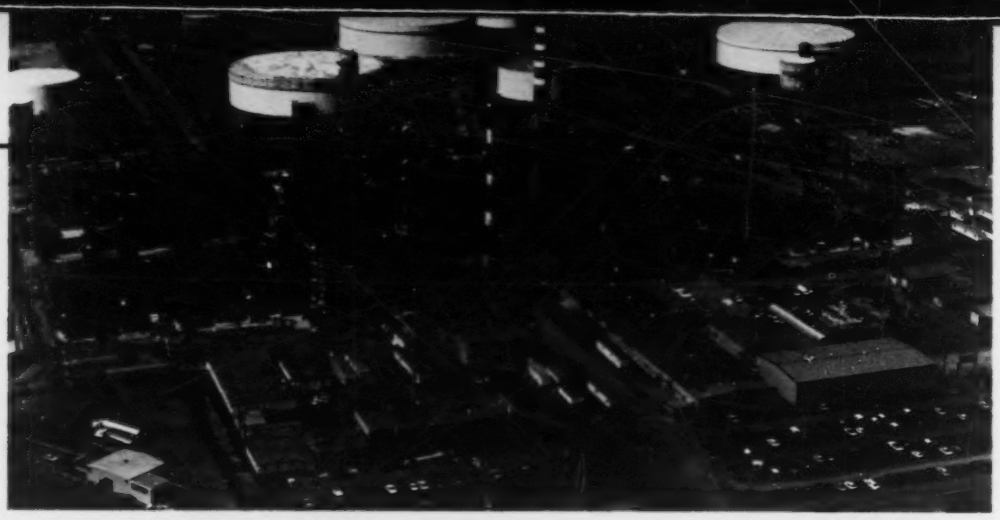
[1] Solvent extraction: [1]14,400 b/cd.

JORDAN			
Jordan Petroleum Refinery–Zerka	100,000	[1]4,410	[2]8,640
Total	**100,000**	**4,410**	**8,640**
KENYA			
Kenya Petroleum Refineries Ltd.–Mombasa	**95,000**	**....**	[1]**9,000**
KOREA, N.			
Government-owned, Unggi	**42,000**		

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
KOREA, S.			
Honam Oil Refinery CL–Yosu	355,000	....	[2]15,300
Kukdong Oil CL–Busan	10,000	....	....
Kyung In Energy CL–Inchon	60,000	....	[2]3,600
Modern Petroleum CL–Busan	2,000	....	....
Ssangyong Oil Refining CL–Onsan[1]	90,000	....	[1]4,000
Yukong Ltd.–Ulsan	265,000	....	[2]17,650
			[4]18,904
Total	**782,000**	**....**	**59,454**
Solvent extraction: [1]8,000 b/d.			
KUWAIT			
Arabian Oil CL–Ras Al Khafji	30,000	....	....
Getty Oil Co. (subsidiary of Texaco Inc.)–Mina Al-Zour	50,000	....	....
Kuwait National Petroleum Co.–Mina Abdulla	70,600	....	....
Mina Al-Ahmadi	288,000	....	[2]36,000
Shuaiba	195,000	....	[2]15,000
Total	**633,600**	**....**	**51,000**
LEBANON			
Tripoli Oil Installations†–Tripoli	35,000	[1]7,250	4,392
Mediterranean Refining Co.–Sidon	17,000	....	[1]3,100
Total	**17,000**	**....**	**3,100**
†Current status incomplete. Not included in totals.			
LIBERIA			
Liberia Petroleum Refining–Monrovia	15,000	....	[1]2,000
Total	**15,000**	**....**	**2,000**
LIBYA			
Azzawiya Oil Refining Co.–Azzawiya	120,000	....	[2]12,982
Ras Lanuf Oil & Gas Processing Co.–Ras Lanuf	201,000	....	....
Sirte Oil Co.–Brega	8,800	....	[1]1,200
Total	**329,800**	**....**	**14,182**
MADAGASCAR			
Solima–Managareza, Tamatave	**16,350**	**....**	**[4]2,600**
MALAYSIA			
Esso Malaysia Berhad–Port Dickson	47,300	....	[2]6,900
Petronas Penapisan Sdn. Berhad–Kerteh, Kemaman, Terengganu	30,000	....	....
Sarawak Shell Berhad–Luton	45,000	....	....
Shell Refining Co. Berhad–Port Dickson	90,000	....	14,000
Total	**212,300**	**....**	**20,900**
MARTINIQUE			
Ste. Anonyme de la Raffinerie des Antilles–Fort-de-France	12,800	....	[2]3,000
Total	**12,800**	**....**	**3,000**
MEXICO			
Petroleos Mexicanos–Azcapotzalco	105,000	[1]23,000	....
Cadereyta	235,000	[1]40,000	[4]20,000
Ciudad Madero	185,000	[1]51,000	[5]15,000
Minatitlan	199,000	[1]24,000	[5]54,000
Poza Rica	16,000	....	....
Reynosa	9,000	....	....
Salamanca	200,000	[1]40,000	[5]24,800
		[2]18,000	
Salina Cruz	170,000	[1]40,000	[5]20,000
Tula, Hidalgo	150,000	[1]40,000	[5]30,000
Total	**1,269,000**	**297,000**	**183,900**

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
MOROCCO			
Samir–Mohammedia	55,703	....	[4]10,935
Ste. Cherifienne des Petroles–Sidi Kacem	25,600	[2]5,600	[1]2,800
Total	**81,303**	**5,600**	**13,735**
MOZAMBIQUE			
Petromoc EE–Matola-Lingamo	**17,000**	**....**	**[1]2,500**
NETHERLANDS			
BP Raffinaderij Nederland NV–Rotterdam	437,000	[1]47,500	[2]27,000
Esso Nederland BV–Rotterdam	154,850	....	[4]25,200
Kuwait Petroleum Europoort BV–Europoort	75,500	....	[2]8,200
Shell Nederland Raffinaderij BV–Pernis	436,000	[1]75,000	45,000
Smid & Hollander Raffinaderij BV–Amsterdam	8,000	....	....
Texaco Petroleum Mij. (Nederland) BV–Pernis	207,000	....	[2]29,000
Total Raffinaderij Nederland NV–Vlissingen	150,000	....	[2]14,000
Total	**1,468,350**	**122,500**	**148,400**
NETHERLANDS ANTILLES			
Refineria Isla Curazao SA–Emmastad	320,000	[1]42,000	[2]15,000
Total	**320,000**	**42,000**	**15,000**
NEW ZEALAND			
New Zealand Refining–Whangarei	**53,000**	**....**	**18,000**
NICARAGUA			
Esso Standard Oil SA Ltd.–Managua	14,500	....	[1]2,800
Total	**14,500**	**....**	**2,800**
NIGERIA			
Nigerian Petroleum Refining CL–			
Kaduna	90,400	[1]18,100	[1]15,400
Port Harcourt, Alesa Eleme	60,000	....	[1]6,000
Warri	100,000	[1]26,000	[2]16,700
Total	**250,400**	**44,100**	**38,100**
NORWAY			
Esso Norge AS–Slagen-Valloy	90,000	....	[2]9,150
Norske Shell AS–Sola	60,000	....	10,000
Rafinor AS–Mongstad	90,000	....	[2]10,000
Total	**240,000**	**....**	**29,150**
OKINAWA			
Nansei Sekiyu KK–Nishihara	45,000	....	[1]5,400
Nippon Petroleum Refining CL–Nakagusuku	8,000	....	[2]2,000
Okinawa Sekiyu Seisei–Yonashiro	57,000	....	....
Total	**110,000**	**....**	**7,400**
OMAN			
Oman Refinery Co.–Mina Al Fahal	**48,082**	**....**	**[2]9,644**
PAKISTAN			
Attock Refinery Ltd.–Rawalpindi	36,000	....	....
National Refinery Ltd.–Korangi, Karachi	47,750	....	[2]2,750
Pakistan Refinery Ltd.–Karachi	46,250	....	[1]3,000
Total	**130,000**	**....**	**5,750**
PANAMA			
Refineria Panama SA–Las Minas	100,000	....	[2]7,500
Total	**100,000**	**....**	**7,500**
PARAGUAY			
Petroleos Paraguayos–Villa Elisa	**7,500**	**....**	

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
PERU			
Petróleos del Peru:			
Conchan	6,290	....	....
Iquitos, Loreto	9,860	....	....
La Pampilla, Lima	93,900	[1]6,230	[3]1,680
Marsella, Loreto	2,040	....	....
Pucallpa	2,440	....	....
Talara	61,030	[1]15,440	....
Total	**175,560**	**21,670**	**1,680**
PHILIPPINES			
Bataan Refining Corp.–Limay	85,000	[2]15,000	[1]17,000
Caltex (Philippines) Inc.–Batangas	63,000	[1]8,100	[2]8,100
Pilipinas Shell Petroleum–Tabangao	68,000	....	8,300
Total	**216,000**	**23,100**	**33,400**
POLAND			
Government-owned refineries at Czechowice, Gdansk, Glinik Mariampolski, Jasto, Jealicze, Kralaty, L. Warynski, Plock, Trzebinia. Of these, Plock is by far the largest, accounting for roughly 80% of Polish refinery production. Its crude capacity is nearly 300,000 b/d.			
Total	**385,000**		
PORTUGAL			
Petrogal–Lisbon	....	[2]10,141	....
Leça da Palmeira, Porto	89,100	....	[5]10,659
Sines	206,507	....	[5]25,240
Total	**295,607**	**10,141**	**35,909**
PUERTO RICO			
Chevron Oil Co.–Bayamón	36,000	[1]12,000	[2]5,800
Yabucoa Sun Oil Co.–Yabucoa[1]	85,000	....	....
Total	**121,000**	**12,000**	**5,800**
[1]Solvent extraction: [1]7,000.			
QATAR			
National Oil Distribution Co.–			
Umm Said	56,058	....	[2]1,576
			[4]8,887
Total	**56,058**	**....**	**10,463**
ROMANIA			
Government-owned refineries at Bacau, Borzesti, Brazi, Brazov, Cimpina, Darmanesti, G. Gheorghiu Dej, Navodari, Onesti, Pitesti, Ploesti, Sulpacu, and Telaejen.			
Total	**617,000**		
SAUDI ARABIA			
Arabian American Oil Co.–			
Ras Tanura	450,000	....	....
Jeddah Oil Refinery–Jeddah	91,000	[1]10,000	[2]2,900
Petromin-Shell–Al-Jubail[1]	270,000	....	16,000
Riyadh Oil Refinery–Riyadh[2]	134,000	....	[2]28,600
Yanbu Domestic Refinery–Yanbu	170,000	....	[2]35,000
Total	**1,115,000**	**10,000**	**87,900**
[1]Solvent extraction: [1]12,500 b/cd. [2]8,800 b/cd.			
SENEGAL			
Ste. Africaine de Raffinage–			
M'Bao (Dakar)	**29,000**	....	[4]2,870
SIERRA LEONE			
Sierra Leone Petroleum Refining			
Co.–Freetown	**10,000**	....	....
SINGAPORE			
BP Refinery Singapore PL			
Pasir Panjang	28,000	....	....
Esso Singapore PL–Pulau Ayer			
Chawan	176,000	....	[2]8,600
Mobil Oil Singapore PL–Jurong	193,000	....	[1]3,000
			[2]10,000
Shell Eastern Petroleum Ltd.–			
Pulau Bukom	460,000	....	17,000
Singapore Refinery CPL†–			
Pulau Merlimau	161,000	....	[4]11,000
Total	**1,018,000**	**....**	**49,600**
†Singapore Petroleum CPL shares percentages of refinery capacities.			
SOMALIA			
Iraqsoma Ref. Co.–Mogadishu	**10,000**	....	....
SOUTH AFRICA			
Caltex Oil SA PL–Cape Town	90,000	[1]25,000	[2]10,500
Mobil Oil Refining Co.–			
Southern Africa PL–Durban	65,000	[1]15,000	[2]19,000
†Durban	....	....	....
National Petroleum Refiners of			
South Africa PL–Sasolburg OFS	78,500	[1]16,000	[2]12,000
Shell and BP South Africa			
Petroleum Refineries PL–Durban	155,000	[1]24,000	[2]21,000
Total	**388,500**	**80,000**	**62,500**
†South African Oil Refinery PL is owner; Mobil is operator.			
SPAIN			
Asfaltos Españoles SA–Tarragona	21,000	....	....
Cia. Española de Petróles–San Roque			
(Cádiz)	176,000	[1]25,000	[2]35,000
Tenerife	176,000	....	[2]19,000
EMP–Cartagena, Murcia	112,000	....	[2]25,000
La Coruña	135,000	[1]25,000	[2]18,500
Puertollano, Ciudad Real	135,000	64,000	
Tarragona	180,000	....	[2]16,000
Petróleos del Mediterraneo–			
Castellón de la Plana	112,000	[1]14,000	[2]14,000
Petronor SA–Somorrostro, Vizcaya	240,000	....	[2]33,500
Unión Explosivos Rio Tinto SA–			
La Rábida, Huelva	80,000	....	[2]14,100
Total	**1,367,000**	**87,500**	**193,100**
SRI LANKA			
Ceylon Petroleum Corp.–			
Sapugaskanda	50,000	....	[2]3,750
Total	**50,000**	**....**	**3,750**
SUDAN			
Port Sudan Refinery Ltd.–Port Sudan	**23,000**	....	[1]1,700
SWEDEN			
AB Nynas Petroleum–Gothenburg	12,000	....	....
Malmoe	3,000	....	....
Nynäshamn	28,000	....	....
BP Raffinaderi–Gothenburg	96,000	....	[2]18,700
Skandinaviska Raffinaderi AB–			
Brofjorden-Lysekil	210,000	[1]26,666	[4]38,888
Svenska Shell–Gothenburg	80,000	....	17,000
Total	**429,000**	**26,666**	**74,588**
SWITZERLAND			
Raffinerie du Sud-Ouest SA–			
Collombey	72,000	....	[2]10,000
Shell Switzerland–Cressier	65,000	....	15,000
Total	**137,000**	**....**	**25,000**
SYRIA			
Banias Refining Co.–Banias	126,350	....	[3]16,728
Homs Refinery Co.–Homs	102,440	....	[3]2,620
Total	**228,790**	**....**	**19,348**
TANZANIA			
Tanzanian & Italian Petroleum			
Refining CL–Kigamboni, Dar es			
Salaam	**13,500**	....	[3]3,000



FLUID CATALYTIC CRACKING complex at Ultramar Canada Inc.'s St. Romuald, Quebec, refinery.

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
THAILAND			
Esso Standard Thailand Ltd.–Cholburi	63,000	....	[2]6,700
Petroleum Authority of Thailand–Bangchak, Bangkok	65,000	....	[2]10,500
Thai Oil Refinery CL–Sriracha, Cholburi	63,860	[1]9,250	[1]2,800
Total	**191,860**	**9,250**	**25,300**
TOGO			
Ste. Togolaise des Hydrocarbures–Lome	**20,000**	....	[4]**4,400**
TRINIDAD			
Trinidad and Tobago Oil CL–			
Pointe-a-Pierre	220,000	[1]25,000	[4]25,000
Point Fortin	40,000	....	[1]4,000
Total	**260,000**	**25,000**	**29,000**
TUNISIA			
Ste. Tunisienne Industries des Raffinage–Bizerte	**34,000**	....	**3,300**
TURKEY			
Anadolu Tasfiyehanesi AS–Mersin	90,000	....	[2]10,500
Turkish Petroleum Refineries Corp.:			
Aliaga-Izmir[3]	102,020	[1]14,000	[2]9,827
Batman	20,000	[2]4,500	[1]1,300
Izmit	248,455	[1]20,100	[2]23,430
Total	**460,475**	**38,600**	**45,057**

Solvent extraction: [1]10,273 b/cd (furfural), 6,038 b/cd (propane deasphalting).

WORLDWIDE REFINING	Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
UNITED KINGDOM			
England			
Conoco Ltd.–South Killingholme	130,000	....	[2]64,000
Esso Petroleum CL–Fawley	300,200	[1]76,500	[2]27,900
			[4]22,500
Lindsey Oil Refinery Ltd.–Killingholm, South Humberside	190,000	[1]35,000	[2]33,600
Mobil Oil CL–Coryton, Essex	145,000	[1]47,000	[2]27,000
	[2]13,500		
Phillips Imperial Petroleum Ltd.–Port Clarence	100,000	....	....
Philmac Oils Ltd.–Eastham, Cheshire	12,000	....	....
Shell U.K. Ltd.–Shell Haven	90,000	18,000	32,000
Stanlow	256,000	55,000	55,000
Total	**1,223,200**	**231,500**	**262,000**
Scotland			
BP Refinery Grangemouth Ltd.–Grangemouth	178,500	[1]19,000	[2]32,000
Shell U.K. Ltd.–Ardrossan	5,000	....	....
Total	**183,500**	**19,000**	**32,000**
Wales			
Amoco UK Ltd.–Milford Haven	102,000	[1]31,500	[2]17,500
BP Refinery Llandarcy Ltd.–Llandarcy, Neath	....	....	....
Chevron Oil Co.–Milford Haven	103,000	....	[3]22,000
Pembroke Cracking Co. (65% Texaco, 35% Chevron)	....	[1]81,500	....
Texaco Ltd.–Pembroke, Dyfed	180,000	....	[6]35,000
Total	**385,000**	**113,000**	**74,500**
Total United Kingdom	**1,791,700**	**363,500**	**368,500**
URUGUAY			
Administración Nacional de Combustibles, Alcohol y Portland–La Teja, Montevideo	45,000	[1]5,000	[1]3,000
Total	**45,000**	**5,000**	**3,000**
U.S.S.R.			

Government-owned refineries at Achinsk, Angarsk, Baku, Batumi, Chimkent, Drogobych, Fergana, Gorki, Grozny, Guryev, Ishimbai, Khabarovsk, Kherson, Kirishi, Komsomolsk, Krasnovodsk, Kremenchug, Kuibyshev, Lisichansk, Mazheikiai, Moscow, Mozyr, Nadvornaya, Nizhnekamsk, Odessa, Omsk, Orsk, Pavlodar, Perm, Polotsk, Ryazan, Saratov, Syzran, Tuapse, Ufa, Ukhta, Vannovskiy, Volgograd, and Yaroslavl.

Total	**12,260,000**		
VENEZUELA			
Corpoven–El Palito	105,000	[1]39,100	[1]6,000
El Toreno	5,000	....	....
Maracaibo	57,000	....	....
Lagoven–Judibana	600,000	[1]71,300	....
Maraven–Punta Cardon	265,000	[1]57,600	....
Meneven–Puerto La Cruz	192,500	[1]11,400	....
San Roque	5,200	....	....
Total	**1,229,700**	**179,400**	**6,000**
VIRGIN ISLANDS			
Hess Oil Virgin Islands Corp.–St. Croix	600,000	....	[2]125,000
Total	**600,000**	**....**	**125,000**
YEMEN, S.			
Aden Refinery Co.–Little Aden	**161,500**	....	[1]**10,800**
YUGOSLAVIA			
Bosanski Brod	43,129	....	[2]6,360
Lendava	18,100	....	....
Novi Sad	11,100	....	....
Pancevo	29,878	....	3,996
Rijeka	180,000	....	18,500
Sisak	38,800	[1]1,960	16,300
Zagreb	600	....	....
Total	**361,607**	**1,960**	**45,156**
ZAIRE			
Soc. Zairo-Italienne de Raffinage–Muanda	17,000	....	[1]3,000
Total	**17,000**	**....**	**3,000**
ZAMBIA			
Indeni Petroleum Refinery CL–Bwana Mkubwa Area, Ndola	**25,000**	....	[4]**5,600**

UNITED STATES

Survey of operating refineries in the U.S. (state capacities as of January 1, 1986)

State	No. plants	Crude capacity b/cd	Cat cracking Fresh feed	Cat reforming
Alabama	2	124,500	.....	27,000
Alaska	6	203,700	.....	12,000
Arizona	1	5,000	.....	.....
Arkansas	4	64,170	18,500	9,000
California	30	2,338,993	595,500	524,800
Colorado	2	79,500	23,000	17,000
Delaware	1	140,000	60,000	53,000
Florida	1	17,500	.....	.....
Georgia	2	35,000	.....	.....
Hawaii	2	109,500	22,000	13,000
Illinois	7	914,600	340,000	292,900
Indiana	4	412,200	166,000	86,500
Kansas	6	311,700	110,000	84,600
Kentucky	2	218,900	100,000	53,500
Louisiana	17	2,244,633	796,100	474,500
Michigan	4	118,100	45,000	33,000
Minnesota	2	222,143	78,000	39,000
Mississippi	5	362,300	74,000	95,800
Montana	5	142,800	50,600	37,700
Nevada	1	4,500	.....	.....
New Jersey	6	415,000	251,000	86,500
New Mexico	3	66,375	27,400	17,300
North Dakota	2	62,800	26,000	12,000
Ohio	5	515,700	190,700	159,700
Oklahoma	5	374,000	133,500	97,000
Oregon	1	15,000	.....	.....
Pennsylvania	8	712,900	264,300	205,200
Tennessee	1	57,000	30,000	8,000
Texas	31	4,132,700	1,587,000	1,046,800
Utah	6	153,875	55,300	27,500
Virginia	1	51,000	27,500	8,750
Washington	7	424,350	91,500	107,800
West Virginia	2	16,500	.....	4,400
Wisconsin	1	32,000	9,700	8,000
Wyoming	6	153,775	61,500	30,750
Total	**189**	**15,252,714**	**5,234,100**	**3,673,000**

U.S. refineries

U.S. REFINING	Crude capacity	b/cd Catalytic cracking	Cat reforming
ALABAMA			
Hunt Refining Co.—Tuscaloosa	44,500	.....	[2]6,000
Louisiana Land & Exploration Co.—Saraland	80,000	.....	[2]21,000
Total	**124,500**	**.....**	**27,000**
ALASKA			
Atlantic Richfield Co.—Kuparuk	12,000	.....	.....
Prudhoe Bay	22,000	.....	.....
Chevron U.S.A. Inc.—Kenai	22,000	.....	.....
Mapco Petroleum Inc.—North Pole	70,000	.....	.....
Petro Star Inc.—North Pole	NR	.....	.....
Tesoro Petroleum Corp.—Kenai	72,000	.....	[2]12,000
Total	**203,700**	**.....**	**12,000**
ARIZONA			
Intermountain Refining Cl—Fredonia	5,000	.....	.....
Total	**5,000**	**.....**	**.....**
ARKANSAS			
Berry Petroleum Co.—Stevens	3,500	.....	.....
Cross Oil & Refining Co. of Arkansas—Smackover	6,800	.....	.....
Lion Oil Co.—El Dorado[1]	48,000	[1]18,500	[2]9,000
Macmillan Ring-Free Oil Cl—Norphlet	5,870	.....	.....
Total	**64,170**	**18,500**	**9,000**

Solvent extraction: [1]5,500 b/d.

CALIFORNIA			
Anchor Refining Cl—McKittrick	10,000	.....	.....
Atlantic Richfield Co.—Carson	211,000	[1]72,000	[2]45,000
Beacon Oil Co.—Hanford	17,300	.....	[2]3,600
Champlin Petroleum Co.—Wilmington	60,000	[1]32,000	[5]13,000
Chevron U.S.A. Inc.—Bakersfield	26,000	.....	[2]6,000
El Segundo	405,000	[1]60,000	[2]60,000
Richmond[1]	365,000	[1]63,000	[2]84,000
Conoco Inc.—Santa Maria	9,500	.....	.....
Edgington Oil Cl—Long Beach	41,600	.....	.....
Exxon Co.—Benicia	109,000	[1]57,000	[4]28,000
Fletcher Oil & Refining Co.—Carson	29,500	[1]10,000	[2]4,200
Golden Bear Division, Witco Chemical Corp.—Oildale	10,818	.....	.....
Golden West Refining Co.—Santa Fe Springs	40,600	[1]13,500	[2]19,000
Huntway Refining Co.—Benicia	8,400	.....	.....
Wilmington	5,500	.....	.....
Kern County Refinery Inc.—Bakersfield	21,400	.....	[2]3,000
Macmillan Ring-Free Oil Cl—Signal Hill	13,000	.....	.....
Mobil Oil Corp.—Torrance	123,500	[1]61,000	[2]36,000
Newhall Refining Cl—Newhall	21,400	.....	[1]2,300
Oxnard Refinery—Oxnard	NR	.....	.....
Pacific Refining Co.—Hercules	55,000	.....	[2]15,000
San Joaquin Refining Cl—Bakersfield	18,000	.....	.....
Shell Oil Co.—Martinez	113,500	[1]60,000	[3]23,000
Wilmington	111,000	[1]35,000	[2]24,000
Superior Processing Co.—Santa Fe Springs	NR	[1]12,000	[3]8,500
Texaco Refining & Marketing Inc.—Bakersfield	38,000	.....	[2]6,500
Wilmington	75,000	[1]28,000	[2]35,000
Tosco Corp.—Martinez	126,000	[1]45,000	[2]8,700
			[6]20,000
Unocal Corp.—Los Angeles	108,000	[1]47,000	[2]52,000
Rodeo	118,000	.....	[2]28,000
Total	**2,338,993**	**595,500**	**524,800**

Solvent extraction: [1]50,000 b/sd.

REFINING

U.S. REFINING	Crude capacity	b/cd Catalytic cracking	Cat reforming
COLORADO			
Asamera Oil U.S. Inc.—Commerce City	NR	[1]8,000	[2]10,000
Conoco Inc.—Commerce City	41,500	[1]15,000	[2]7,000
Total	**79,500**	**23,000**	**17,000**
DELAWARE			
Texaco Refining and Marketing Inc.—Delaware City	140,000	[1]60,000	[2]18,000 [6]35,000
Total	**140,000**	**60,000**	**53,000**
FLORIDA			
Young Refining Co.—St. Marks	17,500	.....	.....
GEORGIA			
Amoco Oil Co.—Savannah	28,000	.....	.....
Young Refining Corp.—Douglasville	7,000	.....	.....
Total	**35,000**	.....	.....
HAWAII			
Chevron U.S.A. Inc.—Barber's Point	48,000	[1]22,000	.....
Hawaiian Independent Refinery Inc.—Ewa Beach	61,500	.....	[1]13,000
Total	**109,500**	**22,000**	**13,000**
ILLINOIS			
Calumet Industries Inc.—Burnham	...	.....	.....
Clark Oil & Refining Corp.—Blue Island	64,600	[1]25,000	[2]30,500
Hartford	60,000	[1]27,000	[2]12,000
Marathon Petroleum Co.—Robinson	195,000	[1]38,000	[1]12,400
Shell Oil Co.—Wood River	264,000	[1]94,000	[2]22,000 [3]75,000
Unocal Corp.—Lemont	151,000	[1]58,000	[2]30,000
Unocal Corp.—Lemont	151,000	[1]58,000	[2]30,000
Total	**914,600**	**340,000**	**292,900**
INDIANA			
Amoco Oil Co.—Whiting	350,000	[1]140,000	[3]75,000
Indiana Farm Bureau Cooperative Association Inc.—Mt. Vernon	20,600	[1]7,000	[4]3,500
Rock Island Refining Corp.—Indianapolis[1]	32,100	[1]19,000	[2]8,000
Young Refining Corp.—Laketon	9,500	.....	.....
Total	**412,200**	**166,000**	**86,500**

Solvent extraction: [1]4,500.

KANSAS			
Derby Refining Co.—Wichita	28,800	[1]17,000	[2]7,000
Farmland Industries Inc.—Coffeyville	56,500	[1]23,000	[2]16,000
Phillipsburg	26,400	.....	[1]5,300
National Cooperative Refinery Association—McPherson	70,000	[1]20,000	[2]15,000
Texaco Refining & Marketing Inc.—El Dorado	80,000	[1]32,000	[2]25,000
Total Petroleum Inc.—Arkansas City	50,000	[1]18,000	[2]16,300
Total	**311,700**	**110,000**	**84,600**
KENTUCKY			
Ashland Petroleum Co.—Catlettsburg[1]	213,400	[1]60,000 §40,000	[2]25,500 [6]27,000
Somerset Refinery Inc.—Somerset	5,500	.....	[4]1,000
Total	**219,900**	**100,000**	**53,500**

Solvent extraction: [1]10,000 b/sd. §Reduced crude converter.

U.S. REFINING	Crude capacity	b/cd Catalytic cracking	Cat reforming
LOUISIANA			
Atlas Processing Co., Division of Pennzoil—Shreveport[1]	46,200	.....	[2]10,000
BP Oil Inc.—Belle Chasse	199,100	[1]89,000	[2]40,000
Calcasieu Refining Co.—Lake Charles	12,150	.....	.....
Calumet Refining Co.—Princeton	4,100	.....	.....
Canal Refining Co.—Church Point	7,858	.....	[1]1,600
Citgo Petroleum Corp.—Lake Charles	320,000	[1]150,000	[2]46,000
			[5]45,000
Claiborne Gasoline Co.—Lisbon	NR	.....	[2]2,000
Conoco Inc.—Lake Charles	156,500	[1]30,600	[2]15,400
			[4]12,000
Cotton Valley Refinery (Kerr-McGee Refining Corp.)—Cotton Valley	7,800	.....	.....
Exxon Co.—Baton Rouge[2]	455,000	[1]155,000	[4]95,000
Hill Petroleum Co.—Krotz Springs	55,300	[1]28,000	[2]12,500
Marathon Petroleum Co.—Garyville	255,000	[1]75,000	[6]50,000
Murphy Oil USA Inc.—Meraux[3]	92,500	[1]35,000	[6]23,000
Placid Refining Co.—Port Allen[4]	46,000	[1]18,500	[2]7,000
Shell Oil Co.—Norco	218,000	[1]100,000	[3]30,000
Tenneco Oil Co.—Chalmette	137,000	[1]45,000	[2]27,000
			[5]18,000
Texaco Refining & Marketing Inc.—Convent	225,000	[1]70,000	[2]40,000
Total	**2,244,633**	**796,100**	**474,500**

Solvent extraction: [1]7,100 b/sd. [2]6,900 b/sd. [3]12,000 b/sd. [4]5,000 b/sd.

MICHIGAN			
Crystal Refining Co.—Carson City	4,000	.....	.....
Lakeside Refining Co.—Kalamazoo	5,600	.....	[1]2,000
Marathon Petroleum Co.—Detroit	68,500	[1]27,000	[2]17,000
Total Petroleum Inc.—Alma	40,000	[1]18,000	[2]14,000
Total	**118,100**	**45,000**	**33,000**

†Dimersol.

MINNESOTA			
Ashland Petroleum Co.—St. Paul Park	67,143	[1]23,000	[2]13,000
	[1]13,000		
Koch Refining Co.—Rosemount	155,000	[1]55,000	[6]26,000
Total	**222,143**	**78,000**	**39,000**

†Dimersol.

MISSISSIPPI			
Amerada-Hess Corp.—Purvis	30,000	[2]18,000	[2]5,800
Chevron U.S.A. Inc.—Pascagoula	295,000	[1]56,000	[2]90,000
Ergon Refining Inc.—Vicksburg	20,500	.....	.....
Southland Oil Co.—Lumberton	5,800	.....	.....
Sandersville	11,000	.....	.....
Total	**362,300**	**74,000**	**95,800**

MONTANA			
Cenex—Laurel[1]	40,400	[1]12,000	[2]12,000
Conoco Inc.—Billings[2]	48,500	[1]15,500	[2]12,500
Exxon Co.—Billings	42,000	[1]21,000	[1]10,000
Flying J Inc.—Cut Bank	5,600	.....	[2]2,200
Montana Refining Co.—Great Falls	6,300	[1]2,100	[2]1,000
Total	**142,800**	**50,600**	**37,700**

Solvent extraction: [1]4,000 b/sd. [2]8,500 b/sd (PDA).

NEVADA			
Nevada Refining Co.—Tonopah	**4,500**	.....	.....

NEW JERSEY			
Amerada-Hess Corp.—Port Reading	.....	[1]55,000	.....
Chevron U.S.A. Inc.—Perth Amboy	80,000	.....	.....
Coastal Eagle Point Oil Co.—Westville	90,000	[1]40,000	[2]38,000
Exxon Co.—Linden	100,000	[1]120,000	[4]25,000
Mobil Oil Corp.—Paulsboro	100,000	[1]36,000	[2]23,500
Seaview Petroleum Inc.—Thorofare	45,000	.....	.....
Total	**415,000**	**251,000**	**86,500**

NEW MEXICO			
Bloomfield Refining Co.—Bloomfield	13,700	[1]5,400	[2]2,800
Giant Industries Inc.—Gallup	18,000	[1]7,500	[2]6,800
Navajo Refining Co.—Artesia	NR	[1]14,500	[1]1,700
			[2]6,000
Total	**66,375**	**27,400**	**17,300**

NORTH DAKOTA			
Amoco Oil Co.—Mandan	58,000	[1]26,000	[4]10,000
Flying J Inc.—Williston	4,800	.....	[2]2,000
Total	**62,800**	**26,000**	**12,000**

OHIO			
Ashland Petroleum Co.—Canton	66,000	[1]25,000	[6]20,000
Chevron U.S.A. Inc.—Cincinnati	43,700	[1]18,000	[2]11,000
Standard Oil Co. of Ohio—Lima	168,000	[1]37,700	[4]47,000
Toledo	120,000	[1]55,000	[3]23,000
Sun CI-Toledo[1]	118,000	[1]55,000	[2]41,000
Total	**515,700**	**190,700**	**158,700**

Solvent extraction: [1]11,000 b/sd.

OKLAHOMA			
Conoco Inc.—Ponca City	134,000	[1]45,000	[2]33,500
Kerr-McGee Refining Corp.—Wynnewood[1]	43,000	[1]20,000	[2]8,500
Sinclair Oil Corp.—Tulsa	50,000	[1]18,000	[2]20,000
Sun CI—Tulsa	85,000	[1]28,000	[2]23,000
Total Petroleum Inc.—Ardmore	62,000	[1]22,500	[6]12,000
Total	**374,000**	**133,500**	**97,000**

Solvent extraction: [1]5,000 b/sd.

OREGON			
Chevron U.S.A. Inc.—Portland	**15,000**	.....	.....

PENNSYLVANIA			
Atlantic Refining & Marketing Corp.—Philadelphia	125,000	[1]29,000	[2]60,000
BP Oil Inc.—Marcus Hook	168,000	[1]48,000	[6]50,000
Chevron U.S.A. Inc.—Philadelphia	174,100	[1]85,300	[2]34,000
Kendall-Amalie Division, Witco Chemical Co.—Bradford	8,600	.....	.....
Pennzoil Products Co.—Rouseville	15,700	.....	[2]3,600
Quaker State Oil Refining Corp—Farmers Valley	6,500	.....	[2]2,000
Sun CI—Marcus Hook	155,000	[1]82,000	[2]39,600
United Refining Co.—Warren	60,000	[1]20,000	[2]16,000
Total	**712,900**	**264,300**	**205,200**

TENNESSEE			
Mapco Petroleum Inc.—Memphis	NR	[1]30,000	[2]8,000
Total	**57,000**	**30,000**	**8,000**

TEXAS			
Amber Refining Co.—Fort Worth	14,500	[1]4,500	[1]1,700
			[2]3,800
American Petrofina Inc.—Port Arthur	90,000	[1]34,000	[2]20,000
Amoco Oil Co.—Texas City	400,000	[1]194,000	[4]131,000
Atlantic Richfield Co.—Houston	278,000	[1]78,000	[2]68,000
Champlin Petroleum Co.—Corpus Christi[1]	170,000	[1]69,000	[5]50,000
Charter International Oil Co.—Houston[2]	NR	[1]50,000	[2]13,500
	[1]15,000		
Chevron U.S.A. Inc.—El Paso	76,000	[1]22,000	[2]25,000
Port Arthur	406,900	[1]110,000	[2]23,000
			[4]44,100

***FLEXICOKER HEATER** and heat exchangers are part of Exxon's Flexicoking project to be completed next year.*

U.S. REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
Coastal States Petroleum Co.—Corpus Christi	95,000	[1]19,500	[5]20,000
Cosden Oil & Chemical (subsidiary of American Petrofina)—Big Spring	NR	[1]23,500	[2]20,000
Crown Central Petroleum Corp.—Houston	100,000	[1]56,000	[2]14,000 [5]22,000
Diamond Shamrock Corp.—Sunray[3]	85,000	[1]45,000	[2]16,000
Three Rivers[4]	45,000	[1]17,000	[2]8,000
Exxon Co. U.S.A.—Baytown[5]	494,000 [1]139,000	[1]155,000	[4]123,000
Howell Hydrocarbons Inc.—San Antonio	9,900	.....	[1]1,200
Koch Refining Co.—Corpus Christi	125,000	[1]40,000	[1]12,000 [3]15,000
LaGloria Oil & Gas Co.—Tyler	65,000	[1]17,000	[2]35,000 [5]11,700
Liquid Energy Corp.—Bridgeport	10,000	.....	.....
Marathon Petroleum Co.—Texas City	69,500	[1]38,000	[1]8,000
Mobil Oil Corp.—Beaumont	270,000	[1]102,000	[2]103,000
Phillips 66 Co.—Borger	100,000	[1]60,000	[2]26,000
Sweeny	175,000	[1]87,000	[2]36,000
Pride Refining Inc.—Abilene	42,750	.....	.....
Shell Oil Co.—Deer Park	228,500	[1]60,000	[2]15,000 [3]40,000
Odessa	28,600	[1]11,500	[1]11,000
Southwestern Refining Cl—Corpus Christi	104,000	[1]50,000	[2]30,000
Texaco Refining & Marketing Inc.—El Paso	17,000	[1]7,000	[2]4,800
Port Arthur[6] and Port Neches	250,000	[1]105,000	[6]40,000
Texas City Refining Inc.—Texas City	119,600	[1]40,000	[1]11,000 [5]12,000
Unocal Corp.—(Beaumnont), Nederland	120,000	[1]39,000	[3]12,000 [4]20,000
Valero Refining Co.—Corpus Christi	NR	†53,000	.....
Total	**4,132,700**	**1,587,000**	**1,046,800**

Solvent extraction: [1]12,000 b/sd. [2]10,000 b/sd. [3]11,000 b/sd. [4]7,000 b/sd. [5]53,000 b/sd. [6]12,000 b/sd.

UTAH

Amoco Oil Co.—Salt Lake City	40,000	[1]18,000	[4]6,000
Chevron U.S.A.—Salt Lake City	45,000	[1]11,000 [2]7,000	[2]5,500
Crysen Refining Inc.—Woods Cross	NR	.....	[3]3,000
RMT Properties Inc.—Salt Lake City	24,000	[2]4,900	[2]5,000
Phillips 66 Co.—Woods Cross[1]	25,000	[2]8,400	[2]6,000
Seagull Refining Co.—Roosevelt	8,000	[1]6,000	[2]2,000
Total	**153,875**	**55,300**	**27,500**

Solvent extraction: [1]5,000 b/sd.

VIRGINIA

Amoco Oil Co.—Yorktown	51,000	[1]27,500	[2]8,750
Total	**51,000**	**27,500**	**8,750**

WASHINGTON

Atlantic Richfield Co.—Ferndale	156,000	.....	[2]50,000
Chevron U.S.A. Inc.—Seattle	5,500	.....	.....
Mobil Oil Corp.—Ferndale	71,500	[2]25,500	[2]11,800
Shell Oil Co.—Anacortes	72,000	[1]36,000	[3]20,000
Sound Refining Inc.—Tacoma	11,900	.....	.....
Texaco Refining & Marketing Inc.—Anacortes[1]	78,000	[1]30,000	[2]20,000
U.S. Oil & Refining Co.—Tacoma	NR	.....	[2]6,000
Total	**424,350**	**91,500**	**107,800**

Solvent extraction: [1]7,400 b/sd.

WEST VIRGINIA

Quaker State Oil Refining Corp.—			
Newell	11,700	.....	[2]3,200
St. Mary's	4,800	.....	[2]1,200
Total	**16,500**	.....	**4,400**

WISCONSIN

Murphy Oil USA Inc.—Superior	**32,000**	[1]9,700	[2]8,900

WYOMING

Amoco Oil Co.—Casper	40,000	[1]13,500	[4]6,000
Little America Refining Co.—Casper	NR	[1]11,000	[2]5,500
Mountaineer Refining Cl—LaBarge	NR	.....	.....
RMT Properties Inc.—Cheyenne	28,800	[1]12,000	[1]1,000 [2]5,500
Sinclair Oil Corp.—Sinclair	53,000	[1]21,000	[1]10,000
Wyoming Refining Co.—Newcastle	12,500	[2]4,000	[1]2,750
Total	**153,775**	**61,500**	**30,750**

Historical reserve data (billion bbl oil)

	1960	1965	1970	1975	1980	1985	1986
Asia-Pacific							
Australia	—	—	2.0	1.7	2.4	1.4	1.4
Brunei	—	—	1.0	2.0	1.7	1.4	1.5
India	—	—	—	—	2.5	3.5	3.7
Indonesia	9.5	9.5	10.0	14.0	9.5	8.6	8.5
Malaysia	—	—	—	2.5	3.0	3.0	3.1
Europe							
Norway	—	—	1.0	7.0	5.5	8.3	10.9
United Kingdom	—	—	1.0	16.0	14.8	13.6	13.0
Middle East							
Abu Dhabi	—	10.0	11.8	29.5	29.0	30.5	31.0
Divided Zone	6.0	12.4	25.7	6.4	6.0	5.4	5.4
Dubai	—	—	—	1.0	1.4	1.4	1.4
Iran	35.0	40.0	70.0	64.5	57.5	48.5	47.9
Iraq	27.0	25.0	32.0	34.3	30.0	44.5	44.1
Kuwait	62.0	62.0	67.1	68.0	64.9	90.0	90.0
Oman	—	—	—	5.0	2.3	3.5	4.0
Qatar	2.5	3.0	3.5	5.8	3.6	3.4	3.3
Saudi Arabia	50.0	60.0	128.5	148.6	165.0	169.0	168.8
Syria	1.0	1.0	1.0	1.0	1.3	1.4	1.4
Africa							
Algeria	5.2	7.4	7.0	7.4	8.2	9.0	8.8
Angola-Cabinda	—	—	—	1.3	1.2	1.8	2.0
Egypt	—	2.0	4.5	3.9	2.9	3.2	3.8
Libya	2.0	10.0	29.2	26.0	23.0	21.1	21.3
Nigeria	—	3.0	9.3	20.2	16.7	16.7	16.6
Tunisia	—	—	—	1.0	1.7	1.5	1.8
Western Hemisphere							
Argentina	2.2	1.9	4.5	2.5	2.5	2.3	2.3
Brazil	—	—	—	—	1.3	1.9	2.0
Canada	—	7.5	10.7	7.1	6.4	7.1	6.5
Colombia	—	1.5	1.7	1.7	1.0	0.624	1.2
Ecuador	—	—	—	2.5	1.1	1.4	1.6
Mexico	2.3	2.5	3.2	9.5	44.0	48.6	49.3
Venezuela	18.5	17.3	14.0	17.7	17.9	25.8	25.6
U.S.A.	33.5	35.4	37.0	33.0	26.4	27.3	28.0
Total Non-Communist	**268.5**	**319.6**	**511.4**	**555.7**	**562.2**	**614.6**	**618.8**
U.S.S.R.	33.5	33.5	77.0	80.4	63.0	63.0	61.0
China	—	—	—	—	—	19.1	18.4
Total World	**302.0**	**353.1**	**611.4**	**658.7**	**648.5**	**698.7**	**700.1**

Refinery throughputs

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
	(Thousand barrels daily)										
U.S.	12,280	12,475	13,435	14,625	14,780	14,465	13,520	12,470	11,775	11,685	12,055
Canada	1,765	1,700	1,710	1,805	1,820	1,960	2,085	1,945	1,650	1,580	1,590
Latin America	5,890	5,515	5,670	5,715	5,975	6,220	6,460	6,575	6,080	5,825	5,825
Western Europe	14,175	12,415	13,625	13,550	13,505	14,160	12,925	11,890	11,480	10,925	11,025
Middle East	2,330	2,075	2,300	2,240	2,535	2,365	2,445	2,205	2,245	2,515	2,665
Africa	930	1,005	1,055	1,165	1,280	1,355	1,460	1,525	1,735	1,920	1,975
Japan	4,300	4,055	4,230	4,285	4,240	4,340	4,015	3,630	3,360	3,255	3,355
Southeast Asia	1,560	1,545	1,865	2,030	2,330	2,450	2,370	2,480	2,335	2,380	2,420
South Asia	550	485	550	605	645	675	705	795	840	880	890
Australasia	625	635	655	680	690	700	640	655	625	605	755
Total Non-Communist	44,405	41,905	45,095	46,700	47,800	48,690	46,625	44,170	42,125	41,570	42,555
Communist	10,185	11,025	11,575	11,930	12,875	13,230	13,320	13,420	13,575	13,675	13,610
Total World	54,590	52,930	56,670	58,630	60,675	61,920	59,945	57,590	55,700	55,245	56,165

Source: British Petroleum